FINAL

1995-1996
SITE MANAGEMENT PLAN

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA

CONTRACT TASK ORDER 0229

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
AST	Aboveground Storage Tank
AWQC	Ambient Water Quality Criteria
Baker	Baker Environmental, Inc.
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHF	Contaminated Hazard Factors
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosives Ordnance Disposal
EPIC	Environmental Photographic Interpretation Center
FFA	Federal Facilities Agreement
FY	Fiscal Year
HRSD	Hampton Roads Sanitation District
IAS	Initial Assessment Study
IRP	Installation Restoration Program
LANTDIV	Atlantic Division, Naval Facilities Engineering Command
MPF	Migration Pathway Factor
NEDED	Naval Explosives Development Engineering Department
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PRAP	Proposed Remedial Action Plan
PRG	Region IX Preliminary Remediation Goal values
PW	Public Works
RA	Remedial Action
RAGS	Risk Assessment Guidance for Superfund
RD	Remedial Design
RF	Receptor Factor
RI	Remedial Investigation
ROD	Record of Decision

SI	Site Investigation
SMP	Site Management Plan
SSA	Site Screening Area
STP	Sewage Treatment Plant
SWMU	Solid Waste Management Unit
TNT	Trinitrotoluene
TRC	Technical Review Committee
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
WES	Waterways Experimental Station
WPNSTA Yorktown	Naval Weapons Station Yorktown, Yorktown, Virginia

1.0 INTRODUCTION

This report presents the Site Management Plan (SMP) for Naval Weapons Station Yorktown, Yorktown, Virginia (WPNSTA Yorktown). As part of the Federal Facilities Agreement (FFA), the SMP is required as the management tool for planning, reviewing, and setting priorities for all remedial response activities to be conducted at the facility. The SMP is updated annually to revise priorities of activities as work progresses and additional information becomes available. This SMP presents the rationale for the sequence of future investigation and remediation activities to be completed and the estimated schedule for completion of these activities, with detailed schedules and deadlines presented for Fiscal Years (FY) 1995 and 1996, as required by the FFA. The use of an SMP allows for annual adjustment in scheduled activities for reasons such as Federal budgetary constraints, changes in scope of investigation/remediation activities or other unanticipated events without modifying the FFA.

Section XII of the FFA requires that the SMP include the detailed scheduling of activities for two fiscal years, annual updating of the scheduled activities, and review and approval by the U.S. Environmental Protection Agency (USEPA) Region III and the Commonwealth of Virginia. As part of the FFA development and by mutual consent of the Navy and the USEPA, several RCRA Solid Waste Management Units (SWMUs) have been included for investigation and evaluation under the FFA. As of FY 1995, there are 15 former SWMUs, two areas identified in the Environmental Photographic Interpretation Center (EPIC) study, two areas of concern (AOC), and one former Installation Restoration Program (IRP) site to be investigated. These 19 areas have been termed Site Screening Areas (SSAs) and are listed in Appendix A of the FFA. Scheduled activities for the 16 sites and 19 SSAs are presented in this SMP.

1.1 Facility Description

WPNSTA Yorktown is a 10,624 acre installation located on the Virginia Peninsula in York and James City Counties and the City of Newport News (Figure 1-1). The installation is bounded on the northwest by the Naval Supply Center Cheatham Annex, the Virginia Emergency Fuel Farm, and the future community development of Whittaker's Mill; on the northeast by the York River and the Colonial National Historic Parkway; on the southwest by Route 143 and Interstate 64; and on the southeast by Route 238 and the community of Lackey.

WPNSTA Yorktown, originally named the U.S. Mine Depot, was established in 1918 to support the laying of mines in the North Sea during World War I. The establishment of the depot was the culmination of a search process, begun in 1917 at the request of Congress, to locate an Atlantic coast site for a weapons handling and storage facility. For 20 years after World War I, the depot received, reclaimed, stored, and issued mines, depth charges, and related materials. During World War II, the facility was expanded to include three additional trinitrotoluene (TNT) loading plants and new torpedo overhaul facilities. A research and development laboratory for experimentation with high explosives was established in 1944. In 1947, a quality evaluation laboratory was developed to monitor special tasks assigned to the facility, which included the design and development of depth charges and advanced underwater weapons. On August 7, 1959, the U.S. Mine Depot was redesignated the U.S. Naval Weapons Station. The primary mission of WPNSTA Yorktown is to provide ordnance, technical support, and related services to sustain the war-fighting capability of the armed forces in support of national military strategy. The long-term plans for the facility are the same as the present plans, with land use also generally the same as at present (Base Master Plan, 1991).

1.2 Environmental Status and Previous Investigations

The environmental condition of WPNSTA Yorktown is being investigated through the Department of Defense's Installation Restoration Program (IRP). On October 15, 1992, WPNSTA Yorktown was included on the National Priorities List (NPL) primarily due to the facility's proximity to wetlands and the potential impact on the surrounding environment.

Previous investigation reports completed through the IRP include the Initial Assessment Study (IAS) (July 1984), two Confirmation Study Reports (June 1986 and June 1988), a Remedial Investigation (RI) Interim Report (July 1991), a Site 21 Site Inspection Report (February 1992), a Focused Biological Sampling and Risk Evaluation Report (April 1993b), and a Round One RI Report (July 1993a).

The purpose of the IAS (C. C. Johnson & Associates, Inc. and CH2M Hill, July 1984) was to identify and assess sites posing a potential threat to human health and/or the environment due to contamination from past operations. A total of 19 potentially contaminated sites was identified based on information from historical records, aerial photographs, field inspections, and personnel

interviews. Each site was evaluated for the type of contamination, migration pathways, and pollutant receptors. The IAS concluded that 15 of the 19 sites were of sufficient threat to human health or the environment to warrant Confirmation Studies.

Two rounds of data were obtained during the Confirmation Study. During the first round of sampling, conducted in the winter of 1986, environmental samples were collected from the 15 sites identified in the IAS. This effort was documented in the "Confirmation Study Step IA (Verification), Round One," (Dames and Moore, June 1986). The initial sampling effort included:

- Installation and sampling of 26 monitoring wells.
- Collection of 21 surface water and sediment samples.
- Collection of 26 surface soil samples.
- Chemical analysis of the samples collected.

The second round of sampling was conducted during November and December 1987. The Round Two effort included:

- Collection of 26 groundwater samples from the previously installed wells.
- Collection of 26 surface water and 32 sediment samples.
- Collection of 12 surface soil samples.
- Chemical analysis of the samples collected.

The results of the analyses and comparisons with appropriate regulatory standards were presented in the "Confirmation Study Step IA (Verification), Round Two," (Dames and Moore, June 1988). The results of these field efforts were combined and summarized in the Draft RI Interim Report (Dames & Moore, February 1989). This report was subsequently revised by Versar in 1991 to incorporate comments from the Technical Review Committee (TRC); this report is referred to as the RI Interim Report. The RI Interim Report recommended that further RI activities be completed at 14 of the 15 sites for which data were available.

In November 1990, WPNSTA Yorktown personnel identified an additional site (Site 21, the Battery and Drum Disposal Area) that had not been included in the previous investigations. A Site Investigation (SI) at Site 21 was conducted in October 1991. Three monitoring wells were installed

and sampled, and surface and subsurface soil samples were collected. The results of this investigation were presented in the "Draft Final Site Inspection Report, Site 21-Battery and Drum Disposal Area, Naval Weapons Station Yorktown, Yorktown, Virginia" (Baker/Weston, February 1992).

The Focused Biological Sampling and Preliminary Risk Evaluation Report (Baker/Weston, 1993b) summarized the results of a limited biological tissue, surface water, and sediment sampling effort conducted in October 1992. The primary object of the sampling program was to evaluate the potential human health risk associated with consumption of fish and shellfish taken from select waters within WPNSTA Yorktown. Analytical results of the biota sampling indicated that contaminants had not bioaccumulated in significant quantities in the fish and shellfish of Lee Pond, Roosevelt Pond, Indian Field Creek, and Felgates Creek so as to pose a significant risk to individuals who fish and/or harvest shellfish from those water bodies.

The RI Interim Report recommended that 14 of the 15 sites be included for further study. However, based on evaluation of the available data, all 15 sites were recommended for further study during the Round One RI. In addition, based on the data obtained from the SI at Site 21, this site was also included in the Round One study (Baker/Weston, July 1993a).

The Round One RI sampling effort included:

- Geophysical investigations.
- Biota investigations.
- Tidal investigations.
- Aquifer testing.
- Monitoring well installation (23 wells).
- Collection of 51 groundwater samples (22 new wells, 29 existing wells; one newly installed well was dry).
- Collection of 196 surface water and sediment samples.
- Collection of 115 surface soil samples.
- Collection of 48 subsurface soil samples.
- Chemical analysis of the samples collected.

The results of the Round One RI indicated that further investigation was needed at all of the 16 sites, with the exception of Site 5, to better define the nature and/or extent of contamination associated with each site. A No Action Record of Decision (ROD) was finalized in September, 1994 for Site 5.

The extent of groundwater contamination and the potential effect of contamination on the environment and the biota inhabiting the Station were considerations of the Round Two RI conducted during the summer of 1994 for Sites 6, 7, 12, 16, and SSA 16.

1.3 Report Organization

The remainder of this report contains five sections. Section 2.0 presents a brief description of the sites and SSAs. Section 3.0 presents a summary of the procedures to be followed as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process that will be used at WPNSTA Yorktown. Section 4.0 presents the system used to rank the sites implementing a risk-based, worst-first model. Section 5.0 provides the schedules for the planned activities at the Station and the assumptions used to develop these schedules. Section 6.0 provides the references used in preparing this document.

SECTION 1.0 FIGURES

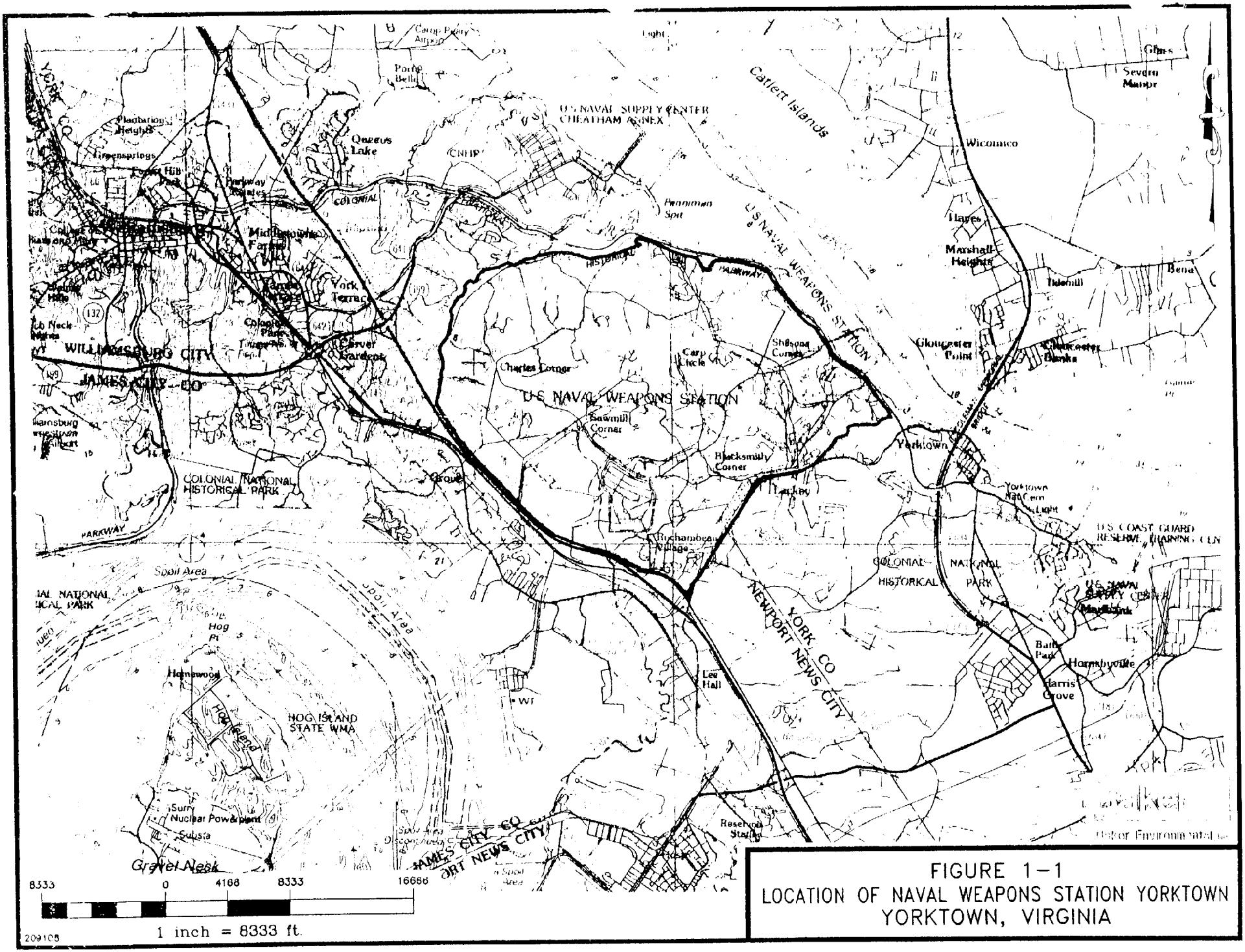


FIGURE 1-1
LOCATION OF NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA

2.0 SITE AND SSA DESCRIPTIONS

This section presents a brief description of each of the current RI/FS sites and SSAs. Table 2-1 lists these areas and Figure 2-1 depicts their approximate sizes and locations.

2.1 Site Descriptions

This section describes the history of the disposal practices at each of the recently investigated RI/FS sites. The information presented is from previous studies (C.C. Johnson & Associates and CH2M Hill, 1984; USEPA, December 1992) and has been updated based on additional historical review and discussions with WPNSTA Yorktown personnel. The site descriptions are presented in numerical order for ease of reference.

2.1.1 Site 1 - Dudley Road Landfill

Site 1 is a 6-acre area located just north of the headwaters of Indian Field Creek. The landfill was in use from approximately 1965 to 1979 for general disposal, with one area used for disposal of plastic lens grinding waste until 1983. Wastes disposed in this landfill include asbestos insulation from steam piping; empty oil, grease, paint, and solvent containers; nitramine-contaminated carbon; household appliances; scrap metal banding; construction rubble; plastic lens grinding wastes; tree limbs; lumber; packaging wastes; electrical wires; and waste oil. The landfill received an estimated 255 tons of waste during the time in which the site was in use. In addition, there is an abandoned sand reclamation pit on the eastern edge of the site and a pond in the western portion of the landfill area. Seasonal ponding also occurs in the southeastern section of the site. Today, the landfill is covered by 2 feet of soil and the abandoned sand reclamation area is covered by 8 feet of soil.

2.1.2 Site 2 - Turkey Road Landfill

Site 2 is a 5-acre landfill located east of Turkey Road in a wetland area adjacent to the southern branch of Felgates Creek. Operations at the landfill reportedly began in the 1940s and ceased in 1981. Wastes disposed in this landfill include mercury and carbon-zinc batteries, tree stumps and limbs, construction rubble, missile hardware (e.g., wings, fins and power packs), electrical devices, and unidentified drums and/or tanks. Waste quantities have been estimated at 240 tons during the

period of use. Hard waste material (mine casings) is primarily located along the tributaries to the southern branch of Felgates Creek. A removal of hard waste material was conducted during the summer of 1994 at Site 2.

2.1.3 Site 3 - Group 16 Magazine Landfill

Site 3 is a 2-acre area located behind the Group 16 magazines, just south of Site 1 (separated by a ravine), along the headwaters of Indian Field Creek. The landfill area was reportedly in use from 1940 to 1970. Wastes disposed at this site include solvents, sludge from boiler cleaning operations, grease trap wastes, Imhoff tank skimmings containing oil and grease, and animal carcasses. This landfill received an estimated 90 tons of waste during the time in which the site was in use. Currently, most of the site, which is overgrown with trees, is covered by 2 feet of soil with some scattered surface debris.

2.1.4 Site 4 - Burning Pad Residue Landfill

Site 4 is a 6-acre landfill located adjacent to the explosives burning facility just south of West Road. This area was in use between 1940 and 1975. Carbon-zinc batteries from underwater weapons, burning pad residues, tree stumps, fly ash from coal-fired burners, mine casings, electrical equipment, and transformers were reportedly buried at this site. A large battery disposal area has been identified in the southeastern portion of the site. In addition, construction debris, pipes, glass, concrete, bottles, cans, and drums have been discovered in various locations within the 6-acre area. An ash pile is present in the northeastern corner of the site. The landfill received an estimated 595 tons of waste during the time in which the site was in use. A removal action was conducted at Site 4 during the summer of 1994 and the area has been revegetated.

2.1.5 Site 5 - Surplus Transformer Storage Area

Site 5 is located near Barracks Road in the northeastern portion of the Station adjacent to the south end of Building 76. Site 5 is also referred to as OU I. The area is approximately 1,000 square feet in size and is fenced. Two concrete pads are located within the fenced area; the remainder of the area is covered with gravel. This site was used from 1940 to 1981 as a storage area for surplus polychlorinated biphenyl (PCB)-containing transformers which were stored on and around the two

large concrete pads. After 1981, only non-leaking transformers were stored at this location. Currently, the stored transformers have been removed and the site is no longer used as a transformer storage area.

An estimated 300 pounds of PCB-containing fluids reportedly leaked from stored transformers. A cleanup effort, conducted in December 1982, included the removal of contaminated soils at Site 5. However, the success of this removal effort was not documented (i.e., no information on the amount of soil removed, verification samples, and type and source of backfill). The recently completed Round One RI investigation and a Risk Evaluation confirmed that the contaminated soils were successfully removed during this effort. Based on the results of the Risk Evaluation and limited confirmational sampling by USEPA, a No Action ROD was finalized for Site 5 on September 29, 1994.

2.1.6 Site 6 - Explosives-Contaminated Wastewater Impoundment

Site 6 is a 3-acre, unlined, surface impoundment located adjacent to wetlands along a small tributary to the main branch of Felgates Creek. This area was in use between 1942 and 1975 and received contaminated wastewaters from the explosives reclamation facility at Building 109 and from weapons loading operations at Building 110 (AOC C and SWMU 179). In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage way. A National Pollutant Discharge Elimination System (NPDES) permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to the Hampton Roads Sanitation District (HRSD). Currently, the impoundment collects only surface runoff from the area between Buildings 109 and 110. In addition, north of the impoundment and northwest of Building 1249, a previously excavated area has been identified via aerial photography. This area is currently wooded, but a concrete foundation, drums, and concrete rubble are evident.

2.1.7 Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area

Site 7 is a drainage area approximately 300 feet long located adjacent to wetlands and along a small tributary to Felgates Creek, approximately one mile upstream from the confluence of Felgates Creek and the York River. This drainage area received nitramine-contaminated wastewater from Loading

Plant 3 between the years 1945 and 1975. In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage way. An NPDES permit was granted by the USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage area and receives no discharge from the Plant 3 complex.

2.1.8 Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area

Site 8 is a 300-foot drainage way located along the eastern branch of Felgates Creek, approximately 1.5 miles from the confluence of the creek and the York River. This area received wastewater from the Naval Explosives Development Engineering Department (NEDED) complex (Building 456) from 1940 to 1975. The wastewater reportedly contained unspecified solvents, spent/neutralized acids, and nitramine compounds. In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage area. An NPDES permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage area.

2.1.9 Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area

Site 9 is a 600-foot drainage ditch located just east of Lee Pond, which empties into the eastern branch of Felgates Creek and topographically downslope from Site 19 (Section 2.1.15). This area was reportedly in use from the late 1930s to 1975. Contaminants in the wastewater from Plant 1 (Building 10) included nitramine compounds as well as organic solvents. During the more than 40 years that the drainage area was used, an estimated 6,800 pounds of nitramine- and solvent-contaminated material may have been discharged to the area. A carbon adsorption tower was installed in 1975 to treat the contaminated wastewater prior to discharge into the drainage area. An NPDES permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage way for surface runoff from surrounding areas and receives no discharge from the Plant 1 complex. A limited removal action was conducted for hard waste present at Site 9 in the natural drainage way between Bollman Road and Lee Pond during the summer and early fall of 1994.

2.1.10 Site 11 - Abandoned Explosives Burning Pits

Site 11 is an area of approximately 0.5-acres located south of Dudley Road, east of Main Road, west of Site 1, and north of a drainage channel leading to Indian Field Creek. This area was used from 1930 to 1950 for burning ordnance and ordnance-contaminated waste. Ashes and residues from the open burning of nitramine-containing wastes and sludges are potentially present at the site. During the 20 years that the pits were used approximately 200 pounds of nitramine waste residues may have been deposited. Currently, the area is thickly vegetated.

2.1.11 Site 12 - Barracks Road Landfill

Site 12 is a 4-acre landfill located east of Barracks Road, north of the community of Lackey, and northwest of the Colonial National Historical Park along a drainage swale leading to Ballard Creek. This area was in operation from approximately 1925 to the mid-1960s. Wastes reported to have been disposed include refuse, scrap wood, and nitramine-contaminated packaging. Because this facility was the predecessor to the Dudley Road Landfill (Site 1), it is likely that wastes similar to those identified at Site 1 (Section 2.1.1), including solvents, were also disposed in this area. The landfill received an estimated 1,400 tons of waste during the time the site was in use. Adjacent to the landfill are two incinerators (SWMU 142 and SWMU 143) formerly used to burn a variety of waste, both industrial and nonindustrial. Incineration ash from incineration activities was disposed on the hillside behind the incinerator buildings. Scrap metal, charred wood and cloth, and medicine bottles were observed in the ash. Located approximately 400 feet east of Site 12 is the Wood/Debris Disposal Area (formerly SWMU 164 and now considered a part of Site 12), which is approximately 4 acres in size. This area consists of a steep ravine in which wooden pallets and construction debris have been disposed. Each area is currently vegetated and drains toward Ballard Creek.

2.1.12 Site 16 - West Road Landfill

Site 16 is a 5-acre area located adjacent to West Road near Indian Field Road. This site was operated from the early 1950s to the early 1960s. Wastes reported to have been disposed include dry carbon-zinc (Leclanche) batteries, banding materials, pressure transmitting fluid, unknown types of chemicals, and 55-gallon drums (contents unknown). A recent investigation at this site confirmed the presence of drums, scrap metal, batteries, mine casings, and construction debris. Another waste

area was also identified beneath one of the drum piles. This waste area consisted of glass containers, cans, and newspapers. Landfill boundaries are not evident from visual observation of the area. The site is wooded, except for the northern portion along West Road, which is covered with grasses. A removal action was conducted at Site 16 during the summer of 1994 to eliminate drums, scrap metal, batteries, and construction debris.

2.1.13 Site 17 - Holm Road Landfill

Site 17 is a 2-acre landfill located south of Holm Road and east of Main Road. The site was operated for approximately 10 years, from the 1950s to the 1960s. Wastes reportedly disposed include acid batteries from underwater weapons, hydraulic fluids (Dolconik) from the demilling of torpedoes, other types of hydraulic fluids, drums from the Public Works Department and ordnance production shops, and scrap metal. An estimated 60 tons of waste was deposited during the period the landfill was in use. Currently, the site is overgrown with mature trees and no evidence of surficial waste is apparent. In addition, results from the geophysical investigation of this site during the Round One RI did not indicate any evidence of buried material.

2.1.14 Site 18 - Building 476 Discharge Area

Site 18 is a one-quarter mile long, unlined drainage ditch located north of Building 476 in the southeastern area of the installation along a small tributary leading to Lee Pond. This area was in use for approximately 20 years from the 1940s to the 1960s. The discharge into the area reportedly contained battery acid waste, consisting of hydrochloric acid or calcium hydroxide and dissolved metals such as lead, cadmium, nickel, and antimony. An estimated 100 to 200 pounds of metals may have been discharged during the operational period. Battery acid waste no longer discharges from Building 476 into this drainage way.

2.1.15 Site 19 - Conveyor Belt Soils at Building 10

Site 19 is a 500-foot long soil strip located beneath and around Building 10, approximately 300 feet from Site 9 and connected to Site 9 via a concrete drainage channel. Nitramine-contaminated soils were reported beneath the conveyor belt between Buildings 10 and 98. In 1973-1974, soils below the conveyor belt were removed; however, later tests indicated that contamination remains.

2.1.16 Site 21 - Battery and Drum Disposal Area

Site 21 covers approximately 1 acre and is located south of West Road adjacent to the ravine that separates Site 21 from Site 4. Historical information for this site is limited. Wastes identified in this area include various sized cans and drums, dry carbon-zinc batteries (Leclanche), empty solvent containers, and scrap metal. A removal action was conducted at Site 21 during the summer of 1994 to remove batteries, drums and debris. The site has been revegetated in those areas affected by the removal.

2.1.17 Site 23 - Burn Pad

Site 23 is located in the central portion of the facility between Sites 4 and 21. A circular array of 11 steel burning pans was used for burning waste plastic explosives and spent solvents. The pans surround a 150-foot inch diameter circular area. Currently the burn pad is not in use and the area is relatively clean, with limited scattered debris. Analytical data are not currently available for environmental media at the Site 23.

2.2 Site Screening Area (SSA) Descriptions

This section describes the history of past disposal practices at each of the SSAs currently included in the FFA. As these are primarily newly identified areas, there is limited information available. The information contained in the following sections has been adapted from USEPA Region III's "RCRA Solid Waste Management Unit Investigation," (December 1992) and "Study Area Analysis, Yorktown Naval Weapons Station Yorktown, Yorktown, Virginia," Volume 1 (November 1992).

2.2.1 Site Screening Area 1 - Building 428 Teague Road Disposal Area

SSA 1 is approximately 7.2 acres in size and is located northeast of Building 428, in the northeast portion of the installation along the facility boundary. The York River is located to the north of SSA 1 and Roosevelt Pond bounds the area to the west/northwest. The area is wooded and bisected by a railroad track that was constructed in 1919 and operated until 1989. Disposal activities reportedly began in 1940 and ceased in 1960. A pier fire occurred in the mid-1950s and debris from this fire may have been disposed in this area (1955 to 1957). Areal photography suggests that past

waste storage practices occurred at SSA 1 (primarily in 1945). From 1960 to the present there has been no evidence of waste storage or release. However, a land survey, conducted in the fall of 1993 as part of a removal action, indicated discrete piles of debris that appear to have been dumped on top of native soils, while other areas of debris appear to be partially buried. The debris was identified as concrete rubble; scrap metal; wooden pilings and railroad ties; empty fuel cans; empty; open; and corroded drums (four drums were found to contain unknown liquids); scrap metal; asbestos pipe insulation; and shingles. A removal action was conducted during the summer and early fall to remove surface debris present at SSA 1.

2.2.2 Site Screening Area 2 - Former EOD Burning/Disposal Area

SSA 2 is an irregular, U-shaped area located at the north end of the existing Explosives Ordnance Disposal (EOD) range and occupying an area of approximately 2.3 acres. The area is currently wooded and strewn with non-explosive arming devices, MK 46 shipping containers, various types of scrap metal, and debris. Numerous earthen berms and depressions indicate that bulldozers and other earth-moving equipment throughout the site. Demolition records indicate that the area was the original site of the EOD range and was actively used throughout the 1950s and 1960s for routine destruction of ordnance. The area was closed in 1970 and operations were moved south to the present EOD range location. Anecdotal information indicates that the move was prompted by growing concerns that range operations might cause forest fires in the wooded areas bordering the site.

2.2.3 Site Screening Area 3 - Fire Training Pits and Vicinity

SSA 3 occupies an area of approximately 2.7 acres, and is located just north of Main Road and Site 16, the West Road Landfill, in the north central portion of the facility. The area consists of three concrete oil pits; one is T-shaped and the other two are rectangular. One rectangular pit is located at the eastern end of the field, the second rectangular pit is located in the western end of the field, and the T-shaped pit is located in the central section of the field, where a patch of stressed vegetation is evident. Berms were built around each of the pit areas in 1986 and a roof was added to each area in 1991. Debris was reportedly placed in each of the pits, doused with jet fuel and set on fire. In addition, in the vicinity of the pits, there appeared to be portions of a tanker trailer that

was formerly used for confined space entry training. The trailer is open on the bottom and placed directly on the soil. The inside of the trailer is blackened and burned.

2.2.4 Site Screening Area 4 - Weapons Casing/Drum Disposal Area

SSA 4 occupies approximately one-half acre between Main Road and Bypass Road at the headwaters of one of the tributaries leading to Roosevelt Pond. The area consists of a ravine in which debris, including weapons casings and drums, has been deposited. There is a flat, grassy area just along the roadway, indicating that this area may be an old landfill. Some of the material in the ravine may be present as a result of landfilling activities. A removal action was conducted at SSA 4 during the summer and early fall of 1994 to remove surface debris in the ravine.

2.2.5 Site Screening Area 5 - Bypass Road Landfill

SSA 5 is located just north of Bypass Road and covers approximately 0.9 acres. This area consists of a ravine in which debris is evident. A small stream passes through the site and exits from a culvert that begins south of Bypass Road. The small stream is the second tributary which flows into Roosevelt Pond. Both Bypass Road and the railroad system were constructed in 1919 and are still in use.

Metal debris, with lesser amounts of concrete and miscellaneous materials, is present at SSA 5. Two empty drums also are present. No wood materials were identified among the surface debris piles.

2.2.6 Site Screening Area 6 - Aviation Field and Environs

SSA 6 is a large area (approximately 69 acres in size) located in the northern portion of the facility. It is bounded by Bellfield Road to the north, Diggs Road to the east, and Main Road to the south and west. The SSA consists of open grassy areas, storage sheds, a helicopter landing pad, and open storage areas with materials stacked on pallets. Historically, the area was used as an aviation field until 1927, after which it was used for storage of munitions in underground caches. Batteries and cables coated with antifoulants containing PCB-1254 and mercury compounds also may have been buried or stored at this location. Aerial photography indicates that peak storage activity occurred in 1968. No storage of liquid or hazardous waste was reported or observed. However, sludges from

the Sewage Treatment Plant (STP) #1 were reportedly disposed in the southeastern portion of SSA 6. In addition, the area in which the helicopter landing pad is currently located may have been used briefly as an explosives burning area. Today, bulk materials such as mine casings, rocket containers, rocket parts, and empty otto fuel tanks are stored in the storage area.

The excavation area, referred to as SWMU #28 in USEPA Region III's Solid Waste Management Unit Investigation Report (1993), formally was listed as a part of SSA 6. However, because the excavation area is located south of Main Road, it has been included in the Remedial Investigation of Site 6, the Explosive-Contaminated Wastewater Impoundment, and will not be addressed in this investigation.

2.2.7 Site Screening Area 7 - Building 373 Rocket Plant/Group 18 Magazines/Main Road Disposal Area

SSA 7, the Rocket Plant, is approximately 14.3 acres in size and is located at the northern end of Main Road (bordering the facility and the main branch of Felgates Creek), just north of Site 6 (Explosive-Contaminated Wastewater Impoundment) and west of SSA 6. Approximately 6 acres of the area wooded. The open areas include:

- Building 373, the Rocket Plant, located in the southwest portion of the site. Explosive loading operations take place in this building.

- Group 18 magazine area, located in the clearing north of the Rocket Plant area. Two bunkers not currently in use also are found in this clearing.

- Main Road Disposal Area, an area of inert mine casings, located south of Main Road on the eastern portion of SSA 7. Many of these inert mine casings are partially buried.

Prior to the 1960s, wash/rinse water from the cleanup of formulation/pouring equipment drained into a settling basin within the building for removal of suspended solids. The solids were open burned at Site 4 (Burning Pad Residue Landfill). The wash/rinse water subsequently was discharged into Felgates Creek. The discharge line to the creek was plugged in the early 1960s and a 220-gallon

underground storage tank (UST), constructed of brick and mortar, was installed to contain the wash/rinse water. From the 1960s to 1980s, the UST received batch wastes from NEDED assembly operations of 2.75-inch rockets as well as the wash/rinse waters. Once the tank was filled, the water was filtered through a carbon unit and discharged to the sanitary sewer system. The UST was closed in the early 1980s when the current aboveground storage tank (AST) was installed. Materials contained within the tanks consisted of binders, curatives, catalysts, stabilizers, and explosives.

In addition to the above areas, USEPA Region III personnel reportedly found "hard waste" (empty mine casings and other miscellaneous wastes) in the woods south/southeast of SSA 7. These hard wastes will be the subject of a removal action during FY 95/96.

2.2.8 Site Screening Area 8 - Building 350 Rail Roundhouse Maintenance Area Trench Outfall

SSA 8 occupies an area of approximately 0.4 acres, and is located outside Building 350, on the railroad tracks, in the southeastern corner of the Station. Underneath the building there are two concrete trenches, which were used to access train engines from below. The trenches reportedly collected drippings generated during train maintenance. The floors of the trenches appear heavily stained; however, the trench drains have reportedly been plugged. Material in the trenches may have drained to the trench outfall and under the road toward the wooded area east of Site 18.

2.2.9 Site Screening Area 9 - Building 1751 Chemistry Laboratory Neutralization Unit and Drainage Area

SSA 9 occupies an area of approximately 1.9 acres, and is located adjacent to Building 1751 in the north central portion of the facility (near Site 8, the NEDED Explosives-Contaminated Wastewater Discharge Area). This SSA consists of a below-grade cylindrical unit into which acids from the Chemistry Lab are discharged for neutralization. The integrity of the unit is unknown it is below ground. In addition, there are four underground septic tanks in the area. Historical records indicate that industrial waste may have been stored in these tanks.

2.2.10 Site Screening Area 10 - Building 28 X-Ray Facility Tank and Drain Field

SSA 10 is located at Building 28 in the south central portion of the installation and occupies an area of approximately 5.8 acres. The area consists of a septic tank and drain field that receives sanitary wastewater from the X-Ray Facility at Building 28. Before silver recovery units were installed, the tanks may have stored hazardous wastes. Stressed vegetation is apparent in this area.

2.2.11 Site Screening Area 11 - Building 3 Neutralization Unit

SSA 11 is located at the southeast corner of Building 3 in the eastern section of the facility (southwest of Site 12) and occupies an area of approximately 0.2 acres. SSA 11 consists of an open, metal tank (approximately 3 feet by 5 feet by 3 feet deep) and associated trench and sump. This tank was apparently used for neutralization of wastes from an unknown process, but has been inactive for at least 15 years. Cracks and pitting are evident in the trench and sump.

2.2.12 Site Screening Area 12 - Public Works Storage Yard/Building 683 Vicinity

SSA 12 is approximately 1.5 acres in size and is located in the Public Works (PW) storage yard and the surrounding area in the eastern portion of the facility near Site 12 and SSAs 11 and 13. One area consists of a field, approximately 150 feet by 300 feet, in which waste generated by the Public Works Department is stored. Drums of used motor oil and used batteries were observed on pallets and directly on the ground. Historically, the area was used to store old tires. Another area, located outside Building 645, consists of a fenced in yard used to store electrical transformers and other electrical equipment. Historical records indicate that wastes may have been stored in this area in the past. In addition, there is a formerly wooded area where demolition debris was reportedly deposited. Concrete debris is visible at the edge of the area. Currently, approximately one-half of the area is used for vehicle storage.

2.2.13 Site Screening Area 13 - Building 529 Battery Drainage Area

SSA 13 occupies an area of approximately one-half of an acre and is located at Building 529 in the eastern portion of the facility near Site 12 and SSAs 11 and 12. The area consists of pavement

where neutralized battery washwater was released and migrated to a storm drain approximately 100 feet away. The pavement is currently worn, with some vegetation apparent.

2.2.14 Site Screening Area 14 - Building 537 Discharge to Felgates Creek

SSA 14 occupies an area of approximately 0.4 acres, and is located outside of Building 537 between Site 8 and SSA 9, in the north central portion of the facility. This SSA consists of a pipe leading from the building, through which nitramine-contaminated wastewater was reportedly discharged to Felgates Creek. Some rubble and rusted piping were found where this pipe was reportedly located.

2.2.15 Site Screening Area 15 - Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area

SSA 15 is comprised of the Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area. It is located in the southeastern corner of the installation, east of Buildings 3 and 4 and south of Site 12 (Barracks Road Landfill). This site covers approximately 0.3 acres and consists of an Imhoff tank, a trickling filter, a sludge drying bed, and a chlorination unit. Wastewater reportedly entered the Imhoff tank, which operated as a primary settling basin for the waste. The water then was passed through the trickling filter for biological treatment and pumped back to the Imhoff tank for secondary settling. The water was chlorinated in the chlorination unit and discharged to a tributary of Ballard Creek. Sludge from the Imhoff tank periodically was removed and placed in the sludge drying bed. STP #1 received managed only sanitary waste from physical plants and the Officer's Club located nearby, but may have treated nitramine-containing and other industrial wastewater. WPNSTA Yorktown personnel that have reported, during the operation of STP #1, a mercury-containing bearing on the trickling filter cracked, allowing mercury to be released. Also, WPNSTA Yorktown personnel indicated that sludges from SSA 15 were brought to SSA 6 and landfarmed. Currently, rainwater fills the trickling filter and Imhoff tank, and substantial vegetation is present in the drying bed.

2.2.16 Site Screening Area 16 - Building 402 Metal Disposal Area and Environs

SSA 16 is located on West Road, just west of Building 402 and encompasses the northern area of Site 16. The area is a large dirt field, approximately 0.4 acres in size, where scrap metal was stored. Dumpsters containing scrap metal are located on the lower southwest side of the yard; scrap metal and empty drums are also scattered over the ground surface near these dumpsters. This area was reportedly used for scrap metal storage prior to the construction of the Hazardous Waste Storage Facility.

2.2.17 Site Screening Area 17 - Building 1456 Mark 46 Waste Otto Fuel Tank

SSA 17, which occupies an area of approximately 2.5 acres, is located northwest of SSA 18 in the central portion of the facility. This area consists of an inactive, 5,000-gallon, underground steel tank and a network of ancillary drain pipes; the tank is located under the parking apron. This tank was used to store waste otto fuel generated during cleaning procedures associated with MK 46 torpedo activities. Waste otto fuel is a mixture of otto fuel and water which potentially contained oils, denatured ethyl alcohol, detergent, and trace amounts of cyanide. Presently, the MK 46 torpedo shop accumulates waste otto fuel in compatible, 55-gallon drums, which are stored for less than 90 days prior to transport off site for disposal. The tank is currently scheduled to be removed in FY 95.

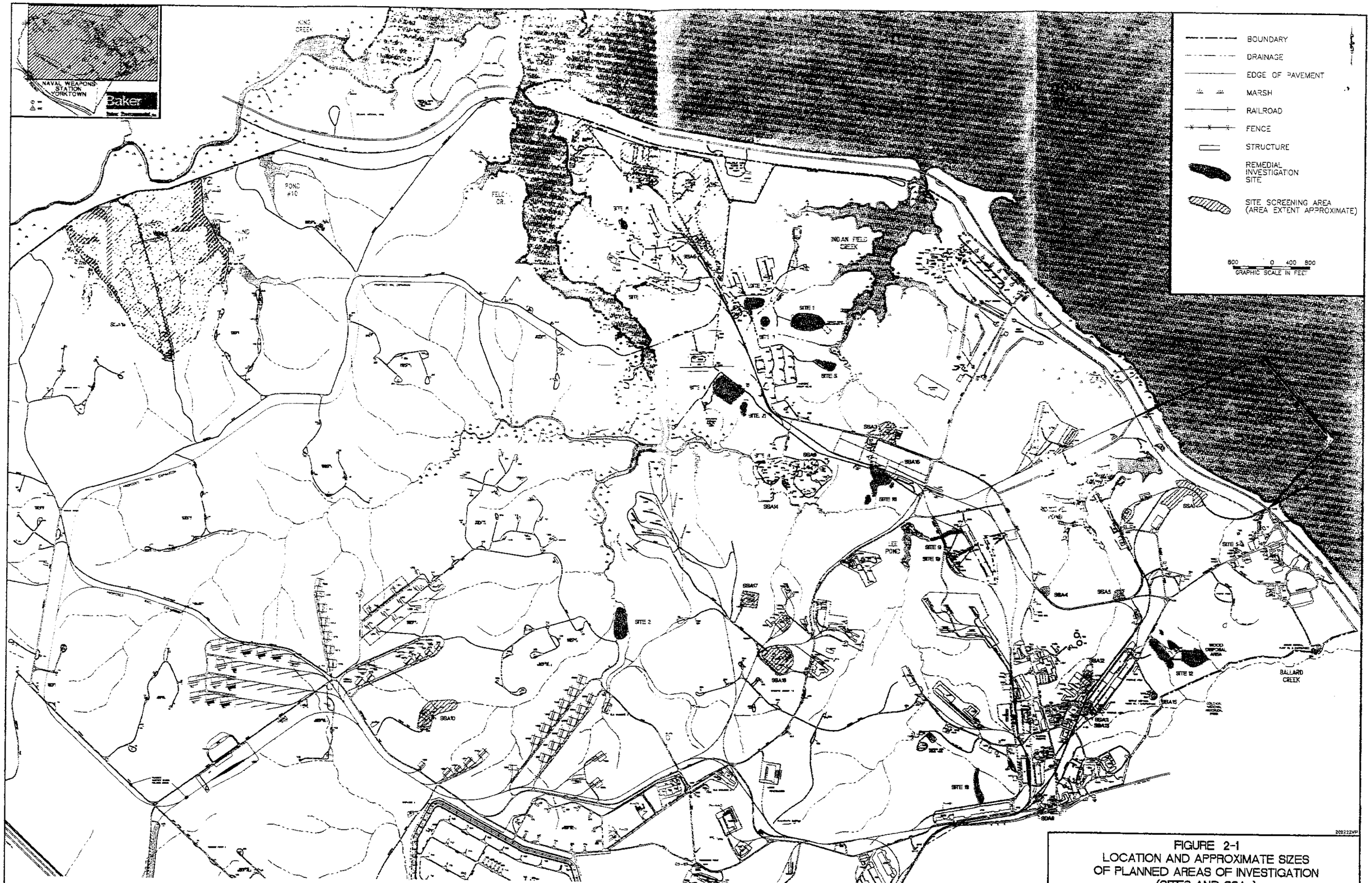
2.2.18 Site Screening Area 18 - Building 1816 Mark 48 Waste Otto Fuel Tank

SSA 18 is located in the central portion of the facility at Building 1816 north of Sharpe Road and west of the intersection of Sharpe Road and Lee Road. Within this area, which is approximately 6.7 acres in size, there is a below-grade, 2,500-gallon concrete tank and network of ancillary drain pipes that was used formerly to store waste otto fuel. This fuel consists of a mixture of otto fuel and water, which may have also contained oils, denatured ethyl alcohol, detergent, and trace amounts of cyanide, halogenated hydrocarbons, and heavy metals. In late 1987, waste otto fuel was discovered leaking from the tank. The fuel was removed, the tank was cleaned, and a RCRA closure permit was filed. In February 1992, the Commonwealth of Virginia approved a closure and post-closure plan for this tank. However, in September 1992, the closure approval was rescinded. There is also an 8,000-gallon underground fuel tank located in the vicinity, which is included in the FY 94/95 scheduled removal action. Currently, removal actions for both tanks are underway.

2.2.19 Site Screening Area 19 - Beaver Road/Ponds 11 and 12 Drainage Area and Environs

SSA 19, which occupies an area of approximately 164 acres, is located in the northwestern section of the facility and encompasses the area surrounding the EOD range, including drainage into Ponds 11 and 12. The area is used for explosive waste destruction. Soil is stacked approximately 40 feet above ground surface, holes are dug about 12 to 20 feet into the mound of soil, the holes are filled with explosive ordnance and backfilled. The explosives are detonated; the same soil is used repeatedly. During the winter, this area is covered and grass is grown to prevent erosion. Unlined settling ponds collect runoff, through pipes, from this area. Effluent from these ponds may discharge to nearby Ponds 11 and 12 and ultimately to King Creek and the York River. In addition, nine metal containers of varying sizes are used for burning explosive waste when hotter burning is required. This type of burning is performed one to two times per year, primarily in the summer.

SECTION 2.0 FIGURES



SOURCE: NAVAL WEAPONS STATION, YORKTOWN, VIRGINIA

209222WP

FIGURE 2-1
LOCATION AND APPROXIMATE SIZES
OF PLANNED AREAS OF INVESTIGATION
(SITES AND SSAs)

NAVAL WEAPONS STATION YORKTOWN YORKTOWN, VIRGINIA

SECTION 2.0 TABLES

TABLE 2-1

SITES AND SITE SCREENING AREAS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Site No.	Site Name	SSA No.	SSA Name
1	Dudley Road Landfill	1	Building 428 Teague Road Disposal Area
2	Turkey Road Landfill	2	Former Explosives Ordnance Disposal (EOD) Burning/Disposal Area
3	Group 16 Magazine Landfill	3	Fire Training Pits and Vicinity
4	Burning Pad Residue Landfill	4	Weapons Casing/Drum Disposal Area
5	Surplus Transformer Storage Area	5	Bypass Road Landfill
6	Explosives-Contaminated Wastewater Impoundment	6	Aviation Field/Excavation Area and Environs
7	Plant 3 Explosives-Contaminated Wastewater Discharge Area	7	Building 373 Rocket Plant Group 18 Magazines Main Road Disposal Area
8	Naval Explosives Development Engineering Department (NEDED) Explosives-Contaminated Wastewater Discharge Area	8	Building 350 Rail Roundhouse Maintenance Area Trench Outfall
9	Plant 1 Explosives-Contaminated Wastewater Discharge Area	9	Building 1751 Chemistry Laboratory Neutralization Unit and Drainage Area
11	Abandoned Explosives Burning Pits	10	Building 28 X-Ray Facility Drain Field
12	Barracks Road Landfill	11	Building 3 Neutralization Unit
16	West Road Landfill	12	Public Works Storage Yard/ Building 683 Vicinity
17	Holm Road Landfill	13	Building 529 Battery Drainage Area
18	Building 476 Discharge Area	14	Building 537 Discharge to Felgates Creek
19	Conveyor Belt Soils at Building 10	15	Sewage Treatment Plant (STP) #1 Sludge Drying Beds and Discharge Area
21	Battery and Drum Disposal Area	16	Building 402 Metal Disposal Area and Environs
23	Burn Pad	17	Building 1456 Mark 46 Waste Otto Tank
		18	Building 1816 Mark 48 Waste Otto Tank
		19	Beaver Road/Ponds 11 and 12 Drainage Area and Environs

3.0 CERCLA PROCESS ACTIVITIES

The investigation and remediation activities to be completed at identified sites at WPNSTA Yorktown will follow the guidelines established by the USEPA as part of the CERCLA process. Once an SSA has been identified as potentially containing contaminated media (soil, sediment, groundwater, etc.) and the site screening investigation and risk screening process (both limited in scope) have determined that a potential risk to human health and/or the environment exists, the SSA will be subjected to full Remedial Investigation/Feasibility Study (RI/FS) process. However, a removal action and/or an interim remedial action may also be appropriate. The decision to implement one or a combination of these actions at either already established RI/FS sites or SSAs is dependent upon the nature and extent of contamination at the site, how well it is characterized, the degree of associated human health and/or environmental risks, and the complexity of the potential remedial actions (i.e., how apparent the optimal remedy is). CERCLA processes are described below.

3.1 RI/FS Process

The RI/FS process is generally the longest step in investigating and remediating CERCLA sites. Figure 3-1 outlines the steps to remedial action under the RI/FS process. For the RI/FS, a full RI, Baseline Risk Assessment, and FS are completed, along with a Proposed Remedial Action Plan (PRAP) prior to the formal public comment period. After the public comments have been addressed as part of the Responsiveness Summary in the ROD, the ROD is placed in the Administrative Record. Subsequent to completion of the ROD, remedial design (RD) activities are initiated, followed by the implementation of the remedial action (RA).

Presumptive remedies are also part of the RI/FS process. Presumptive remedies apply to certain types of sites such as landfills which received a variety of waste types and where containment of these wastes is the preferred remedial alternative. Candidate sites for presumptive remedies should be identified early in the investigative process. Once identified, presumptive remedy sites follow the same general process as presented in Figure 3-1, but have streamlined RIs and FSs. Streamlined

RI/FS documents evaluate the sites and site dynamics, evaluate risks and bypasses the initial screening and identification of remedial alternatives other than containment.

3.2 Removal Actions

Removal actions are those actions taken to clean up or remove released hazardous substances from the environment. In addition, a removal action may also be implemented to mitigate, minimize, or prevent damage to human health and the environment from a release or threat of a release by limiting exposure to the hazardous substances (i.e., security fencing or access limitation). Removal actions are classified as either time-critical or non-time-critical. Time-critical removal actions are taken when there is an imminent threat to human health and the environment, such as corroded drums of wastes that are leaking into groundwater. Non-time-critical removal actions are defined as actions that, based on the degree of potential risk to human health and/or the environment, may be delayed for six months or more before on-site cleanup is initiated.

All removal actions currently planned at WPNSTA Yorktown are classified as non-time-critical removal actions. A removal action may be completed any time during the RI/FS process; however, it will often begin prior to the completion of the RI/FS to mitigate the spread of contamination.

Figure 3-2 shows the general process for non-time-critical removal actions. Rather than preparing an FS, an Engineering Evaluation/Cost Analysis (EE/CA) is completed which focuses only on the substances to be removed and not on all potentially contaminated media (other contaminated media will be addressed as part of the RI/FS process). Because the scope of a removal action is typically smaller than a final, full-scale remedial action, the time frames for completion of the EE/CA, related design efforts, and implementation of the removal action are much shorter than for a full scale FS. The opportunity for public involvement is similar to the FS, with a public comment period and a Removal Action Memorandum completed to document the evaluation and choice of removal action procedures. It should be noted that a removal action may become the final remedial action if the risk screening/assessment results indicate that further remediation is not required for protection of human health and the environment. Where no further action is required at a site that has undergone a

removal action, a no action ROD will be signed between the concerned parties in order to remove the site from the program.

3.3 Interim (Early) Remedial Actions

Early remedial actions are those activities which are designed to provide temporary mitigation of potential risks posed by a site until a final remedial action is selected. As with removal actions, early remedial actions usually take place prior to initiation of a full-scale FS because of the risks posed by the contamination in the area. For example, installation of a groundwater pump and treat system to control plume migration would be considered an early remedial action. Initiation of an early remedial action early in the CERCLA process might reduce costs in the long term by limiting the extent of contaminant migration.

The early remedial action process is shown in Figure 3-3. Rather than preparing an FS, a Focused FS is completed, as is an early action ROD to document the activities to be performed. Design and implementation activities follow. It should be noted that an early remedial action may become the final remedial action if the risk screening/assessment results for protection of human health and the environment indicate that further remediation is not required.

3.4 Presumptive Remedies

Presumptive Remedies help to streamline the site cleanup process by eliminating the need for initial identification and screening of alternatives during the FS. Presumptive Remedies are preferred technologies for common categories of sites based on historical patterns of remedy selection at similar types of sites. The selection of a presumptive remedy must be considered at the beginning of the RI/FS process so that particular attention can be paid to the risk evaluation, areas of potential contaminant migration and identification of hot spots.

3.5 Treatability Studies

Treatability studies will be conducted prior to finalization of FS reports to better evaluate a particular technology's performance. Treatability studies are conducted to

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated

- Support the remedial design of a selected alternative

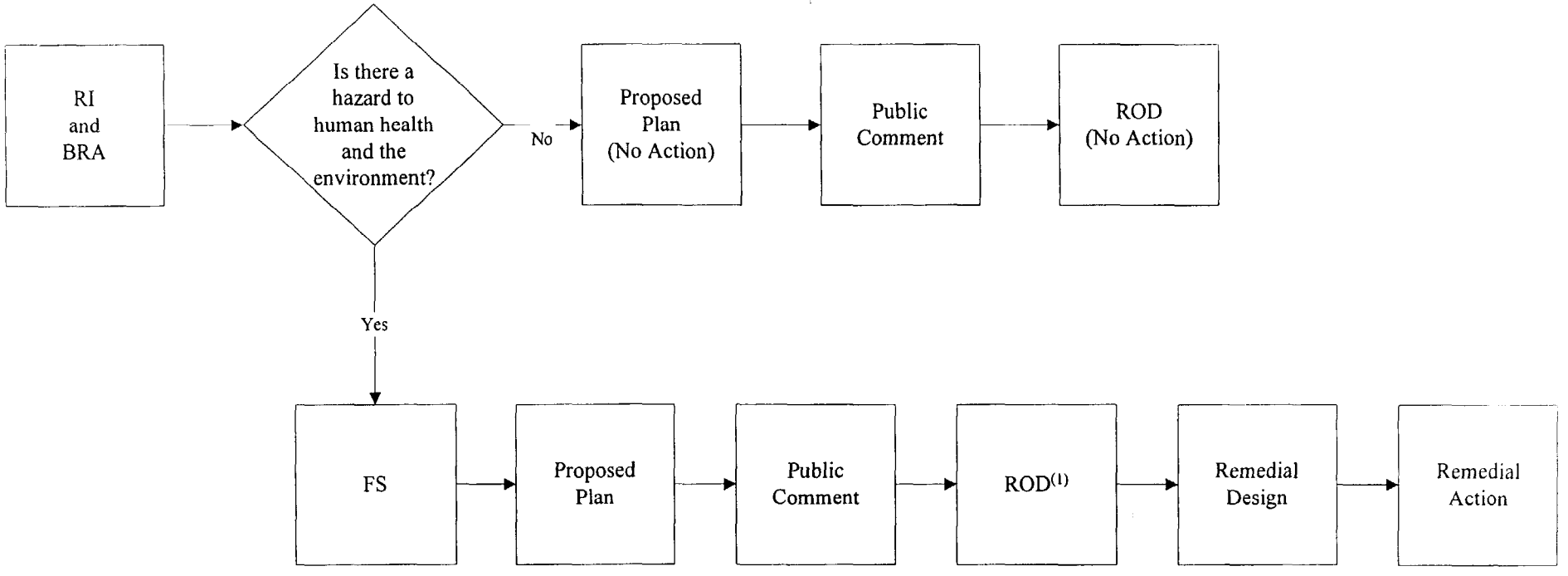
- Reduce cost and performance uncertainties for treatment alternatives to acceptable levels to aid in remedy selection.

Treatability studies for explosives-contaminated soils will be conducted in FY 1995 concurrent with ongoing IR activities. These studies should provide data for FSs involving explosives- contaminated sites by early 1996.

SECTION 3.0 FIGURES

FIGURE 3-1

RI/FS PROCESS

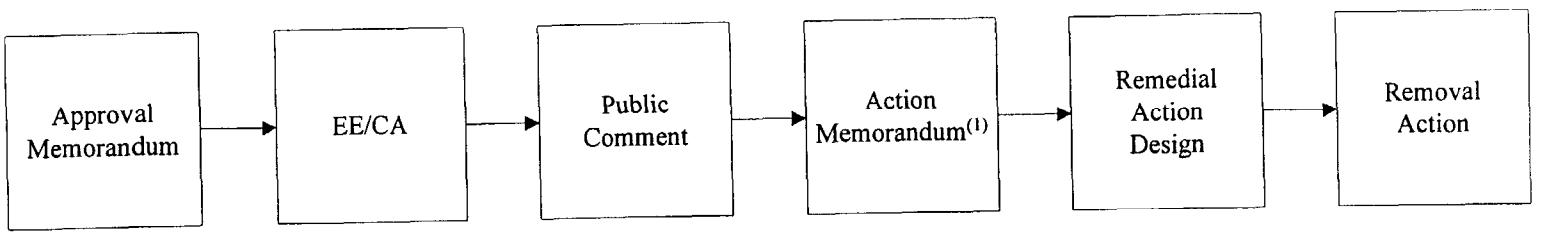


RI = Remedial Investigation
BRA = Baseline Risk Assessment
FS = Feasibility Study
ROD = Record of Decision (including Responsiveness Summary)

(1) Includes summary of any Interim Remedial Actions or Removal Actions for the Operable Unit.

FIGURE 3-2

NON-TIME CRITICAL REMOVAL ACTION PROCESS

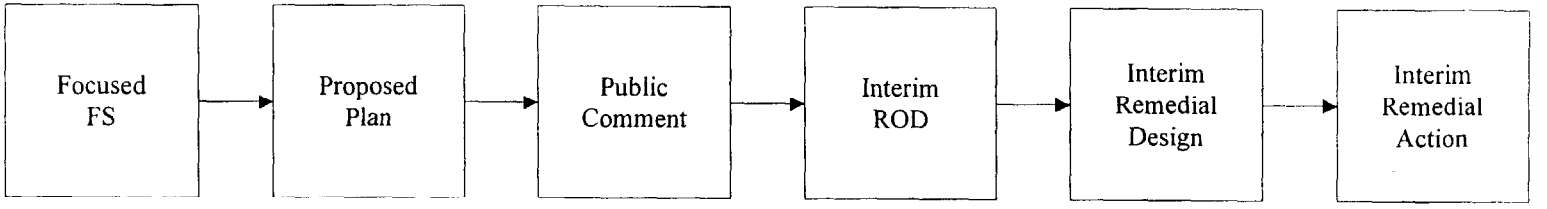


EE/CA = Engineering Evaluation/Cost Analysis

(1) Includes Responsiveness Summary to Public Comment.

FIGURE 3-3

INTERIM REMEDIAL ACTION PROCESS



FS = Feasibility Study
ROD = Record of Decision

4.0 SITE RANKING

The site ranking methodology has been developed to rank sites so that the worst sites, as defined by the greatest detected concentration of specific compounds (usually based on a limited amount of data), in conjunction with the compounds' toxicity, potential for human and/or ecological exposure, and potential for contaminant migration, are prioritized. This ranking methodology is a site management tool to indicate, by actual media concentrations, toxicity, potential exposure, and potential migration, which sites may pose the greatest risk to human health and/or the environment and focus study and remediation on these sites. The methodology is both quantitative and qualitative in nature, as presented in the following sections. For SSAs that have no chemical data, those closest to the boundary of the facility will be studied first to ensure that any potential off-Station contaminant migration is identified and treated, as appropriate. These areas will undergo the Site Screening Process (as defined in the FFA, Subsection 9.3). Figure 4-1 presents the points at which decisions will be made to determine the fate of each SSA (i.e., whether an RI/FS will be performed on the area, or whether the area does not pose a threat to public health, welfare, or the environment and, therefore, should be removed from further study).

4.1 Site Ranking - Quantitative Analysis

For the quantitative screening analysis, human health was evaluated by assuming that groundwater was used as tap water (both ingestion and inhalation exposure scenarios were included in the tap water determination) and soil contact was assumed to be residential (including both ingestion and dermal contact scenarios), as described in the USEPA Region IX Preliminary Remediation Goal (PRG) values (USEPA Region IX, updated biannually) (USEPA, 1994). Ecological risk was determined for the aquatic environment only (surface water and sediment), since benchmark values for terrestrial ecological risk are not readily available. Note that surface water has not been considered as tap water in the screening methodology because; 1) surface water is almost exclusively treated before use, 2) significant dilution occurs between source and intake, and 3) surface water in the vicinity of the majority of Navy sites is brackish.

To initially rank the sites, Contaminant Hazard Factors (CHFs) for human health (carcinogenic and noncarcinogenic) and ecological risk were calculated. These CHF values were determined by dividing the maximum detected concentration of particular compounds in the environmental media

(soil, groundwater, surface water and/or sediment) by the corresponding, most recent USEPA Region IX PRG value, Federal Ambient Water Quality Criteria (AWQC), and/or National Oceanographic Atmospheric Administration (NOAA) sediment screening value. Appendix A presents the ratios calculated for each sampled environmental medium at each of the 16 sites at WPNSTA Yorktown.

Equations for these calculations are as follows:

Human Contaminant Hazard Factor Calculation - Groundwater

Carcinogens

$$CHF_{gwc} = \sum (C_{max} / PRG)$$

Noncarcinogens

$$CHF_{gwnc} = \sum (C_{max} / PRG)$$

where: CHF_{gwc} = Contaminant Hazard Factor, sum of groundwater carcinogenic ratios
C_{max} = Maximum detected concentration (µg/L)
PRG = USEPA Region IX tap water PRG (µg/L)
CHF_{gwnc} =Contaminant Hazard Factor, sum of groundwater noncarcinogenic ratios

Human Contaminant Hazard Factor Calculation - Soil

Carcinogens

$$CHF_{ssc} = \sum (C_{max} / PRG)$$

Noncarcinogens

$$CHF_{ssnc} = \sum (C_{max} / PRG)$$

where: CHF_{ssc} = Contaminant Hazard Factor, sum of surface soil carcinogenic ratios
C_{max} = Maximum detected concentration (mg/kg)
PRG = USEPA Region IX residential soil PRG (mg/kg)
CHF_{ssnc} = Contaminant Hazard Factor, sum of surface soil noncarcinogenic ratios

Ecological Contaminant Hazard Factor Calculation - Surface Water/Sediment

Surface Water

$$CHF_{sw} = \sum (C_{max} / AWQC)$$

Sediment

$$CHF_{sd} = \sum (C_{max} / NOAA)$$

where: CHF_{sw} = Contaminant Hazard Factor, sum of surface water ratios
C_{maxsw} = Maximum detected concentration surface water (µg/L)

AWQC = Ambient Water Quality Criteria (μg/L)
CHF_{sd} = Contaminant Hazard Factor, sum of sediment ratios
C_{maxsd} = Maximum detected concentration sediment (mg/kg)
NOAA = Sediment screening value (mg/kg)

4.2 Site Ranking - Qualitative Analysis

Once the quantitative assessment was complete, a qualitative assessment addressing potential exposure and potential migration was performed. This analysis was conducted to ensure that where human and/or ecological exposure to the contaminated media exists and the potential for contaminant migration is high, these sites are investigated before sites with less potential to impact human health and the environment. This analysis was performed by asking and answering four questions regarding the potential receptors at a site and four questions regarding potential contaminant migration (the migration question was the same question asked for each environmental media: groundwater, surface soil, surface water, and sediment). Table 4-1 summarizes the initial ratios calculated and the answers to the qualitative questions.

4.2.1 Receptor Factor

The Receptor Factor (RF) was used to identify the actual and/or potentially exposed human and ecological populations at each site. The RF was determined for each of the four environmental media for which data were collected.

4.2.1.1 Groundwater

For human receptors potentially exposed to contaminated groundwater, one of the following three statements was selected to represent conditions at a particular site:

a) Groundwater is currently used for human activities (i.e., drinking, agriculture, recreation).

b) Groundwater is not currently used for human activities (i.e., drinking, agriculture, recreation), but may be in the future.

c) In the future groundwater will not be used for human activities (i.e., drinking, agriculture, recreation) because of high salinity, chlorides, total suspended solids, etc.

4.2.1.2 Surface Soil

For human receptors potentially exposed to contaminated surface soil, one of the following three statements was selected to represent conditions at a particular site:

a) There are sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) present in the area and/or the area is routinely used by non-sensitive receptors (i.e., workers, individuals undergoing training).

b) Sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) may be to be present in the area and/or the area is occasionally used by non-sensitive receptors (i.e., workers, individuals undergoing training).

c) Sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) are not present in the area and/or the area is not used by non-sensitive receptors (i.e., workers, individuals undergoing training).

4.2.1.3 Sediment

For aquatic ecological receptors potentially exposed to contaminated sediment, one of the following three statements was selected to represent conditions at a particular site (these are the same statements used to represent the conditions for surface water receptors):

a) Evidence exists that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist on or are near the site.

b) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. have not yet been identified on or near the site, but may be identified in the future.

c) It is unlikely that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist; or if they do exist, they are protected by natural conditions (e.g. hydraulic gradient, attenuation, dilution).

4.2.1.4 Surface Water

For aquatic ecological receptors potentially exposed to contaminated surface water, one of the following three statements was selected to represent conditions at a particular site:

a) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist on or near the site.

b) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. have not yet been identified on or near the site, but may be identified in the future.

c) It is unlikely that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist; or if they exist, are protected by natural conditions (e.g. hydraulic gradient, attenuation, dilution).

4.2.2 Migration Pathway Factor

The Migration Pathway Factor (MPF) was used to identify the likelihood of off-site contaminant migration in any of the environmental media at the site. The MPF was determined for each media sampled at a particular site by selecting one of the following statements that applies to the sampled environmental media:

a) There is physical evidence/analytical data indicating off-site contaminant migration.

b) There is no current indication of off-site migration, but the potential for migration exists.

c) Present engineering structures and/or physical/chemical properties of the detected constituents greatly restrict the potential for off-site migration.

4.2.3 Quantification of Qualitative Questions - Adjusted Ratios

Both the receptor factor and the migration pathway factor were quantified to incorporate the results of the qualitative media evaluation by adjusting the media-specific CHF to account for the influence(s) of potential human and/or ecological receptors and potential contaminant migration. Table 4-2 presents the adjusted risk ratios per sample media.

4.2.3.1 Quantification of Receptor Factor

The media-specific CHF was adjusted in the following manner to account for potential human and/or ecological receptors:

- If the selected response to the groundwater RF was (a) the carcinogenic CHF for groundwater multiplied by a factor of 100 and the noncarcinogenic CHF was multiplied by a factor of 10. If the selected response was (b) the carcinogenic CHF for groundwater was multiplied by a factor of 10 and the noncarcinogenic CHF was multiplied by a factor of 5.

- If the selected response to the surface soil RF was (a) the carcinogenic CHF for surface soil was multiplied by a factor of 100 and the noncarcinogenic CHF was multiplied by a factor of 10. If the selected response was (b) the carcinogenic CHF for surface soil was multiplied by a factor of 10 and the noncarcinogenic CHF was multiplied by a factor of 5.

- If the selected response to the surface water RF was (a) the surface water CHF was multiplied by a factor of 10. If the selected response was (b) the surface water CHF was multiplied by a factor of 5.

- If the selected response to the sediment RF was (a) the sediment CHF was multiplied by a factor of 10. If the selected response was (b) the sediment CHF was multiplied by a factor of 5.

The carcinogenic multiplier of 100 was developed to account for the target risk range for carcinogens, between 1 x 10^{-4} and 1 x 10^{-6}. The noncarcinogenic multiplier of 10 was developed using the uncertainty factor approach as defined in the USEPA's Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989). The factor of 10 was used to account for different mechanisms of action and effects on differing organ systems by various chemicals. These factors were used to ensure that sites with a greater probability of actual human exposure would rank higher than those sites at which potential or no human contact is anticipated. The ecological multiplier of 10 was included to ensure that sites impacting federal and/or state threatened or listed endangered species, wetlands, migratory bird habitats, etc. would have higher investigative priority than sites at which these habitats are not apparent (e.g., drainage ditches). The quantification values for RF responses of (b) were selected to give higher priority to those sites that have the potential to affect human health and the environment over sites that have little or no potential to affect human health or the environment.

4.2.3.2 Quantification of Migration Pathway Factor

The media-specific CHF was also adjusted to account for potential contaminant migration in the following manner:

- If the selected response to the groundwater MPF was (a), both the carcinogenic and noncarcinogenic CHF values for groundwater were multiplied by a factor of 10. If the selected response was (b), the carcinogenic and noncarcinogenic CHF values for groundwater were multiplied by a factor of 5.

- If the selected response to the surface soil MPF was (a), both the carcinogenic and noncarcinogenic CHF values for surface soil were multiplied by a factor of 10. If the selected response was (b), the carcinogenic and noncarcinogenic CHF values for surface soil were multiplied by a factor of 5.

- If the selected response to the surface water MPF was (a), the surface water CHF was multiplied by a factor of 10. If the selected response was (b), the surface water CHF was multiplied by a factor of 5.

- If the selected response to the sediment MPF was (a), the sediment CHF was multiplied by a factor of 10. If the selected response was (b), the sediment CHF was multiplied by a factor of 5.

These factors were chosen to increase the priority of those sites with evidence of, or the potential for, off-site contaminant migration, respectively.

4.3 Total Site Risk Screening Values

Table 4-3 presents the summarized, adjusted risk ratios for carcinogenic, noncarcinogenic, and ecological risks at each of the 16 sites investigated in the Round One RI. Once the adjusted values for each media were determined, carcinogenic, noncarcinogenic, and ecological adjusted ratios across media were summed. That is:

- For human health, the adjusted carcinogenic values for groundwater and soil were added for a total site carcinogenic risk screening value.

- Also for human health, the adjusted noncarcinogenic values for groundwater and soil were added for a total site noncarcinogenic risk screening value.

- For ecological risk, the adjusted surface water and sediment values were added to determine the total ecological risk screening value for each site.

For human health, the total site carcinogenic and noncarcinogenic risk screening values were determined in the following manner:

Human Health Risk Screening Value

Carcinogens	Noncarcinogens
$RSV_c = Adj_{gwc} + Adj_{ssc}$	$RSV_{nc} = Adj_{gwnc} + Adj_{ssnc}$

where: RSV_c = Total carcinogenic risk screening value (soil/groundwater)
Adj_{gwc} = Adjusted groundwater carcinogenic value
Adj_{ssc} = Adjusted surface soil carcinogenic value
RSV_{nc} = Total noncarcinogenic risk screening value (soil/groundwater)
Adj_{gwnc} = Adjusted groundwater noncarcinogenic value
Adj_{ssnc} = Adjusted surface soil noncarcinogenic value

For ecological risk, the total site risk screening value was determined in the following manner:

Ecological Risk Screening Value

$RSV_{eco} = Adj_{sw} + Adj_{sd}$

where: RSV_{eco} = Total ecological risk screening value (surface water/sediment)
Adj_{sw} = Adjusted surface water value
Adj_{sd} = Adjusted sediment value

4.4 Site Ranking Summary

These site risk screening values were then ranked with the lowest non-zero (or non "--") value in each category (i.e., the least potential risk) receiving a score of 1. Categories with no available data were not considered in the site ranking. In this case, that particular category was normalized to ensure that all three categories were evaluated on the same relative scale. To determine this normalization factor, the number of entries from the longest column was determined and designated "N_{max}". N_{max} was then divided by the number of entries in each of the other two columns to calculate the normalization factor for that category/column. Ranks within categories containing entries less than N_{max} were multiplied by the calculated normalization factor.

Once the ranks were normalized, the rank sum method was used to evaluate carcinogenic, noncarcinogenic, and ecological parameters together. Since these are distinctly different measurements, the actual ratios cannot be summed; rather the ranks were summed to allow for addition of unlike terms. The site with the highest sum of the normalized rank was then considered to be the worst site based on chemical concentration, toxicity, and exposure. Table 4-4 lists the sites in order of rank on a worst-first priority basis.

4.5 Site and SSA Investigation Prioritization

The above ranking system was used to aid in the prioritization of investigation activities at WPNSTA Yorktown within the SMP. With the exception of the Burn Pad (for which no analytical data are available), sites were ranked using a slightly different methodology than that presented in the FY 94/95 SMP. As a result, Sites 6, 7, 12, 16, and SSA 16 were prioritized and scheduled to be investigated first. Field investigations of these sites were completed in September of 1994 and RI/FS reports are forth-coming.

Site ranking and additional factors, such as current funding allocation, completion of removal actions, and proximity of sites to one another have been considered to prioritize the investigation of the remaining sites. The following list presents the order in which the sites currently are planned to be investigated during FY 1995 and FY 1996:

- Site 16 and SSA 16 - RI/FS reports (based on the completion of field activities)
- Sites 4 and 21 - RI/FS reports using removal action soil data and Round One RI information (based on site ranking, removal action, proximity to one another, and proximity to Felgates Creek)
- Site 12 - RI/FS reports (based on the completion of field activities)
- Sites 9 and 19 - Field Investigation, RI/FS reports (based on site ranking, removal actions, proximity to one another, and proximity to Felgates Creek)

- Sites 1 and 3 - Field Investigation, RI/FS reports (based on site ranking, proximity to one another, and proximity to Felgates Creek)

- Sites 6 and 7 - RI/FS reports (based on the completion of field activities)

- Sites 11 and 17 - Field Investigation, RI/FS reports (based on site ranking proximity to one another and proximity to Felgates Creek)

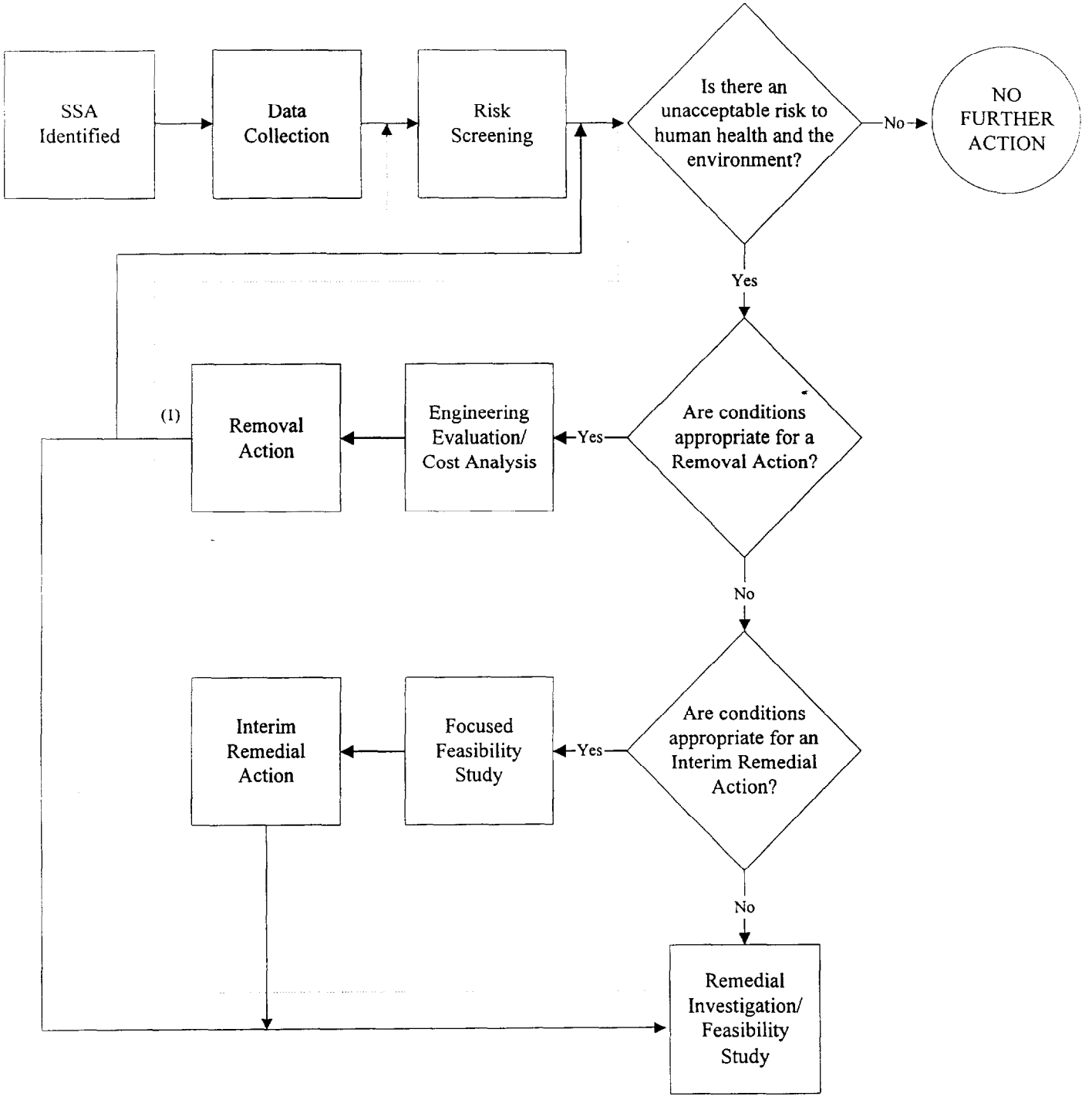
There are insufficient data to rank the SSAs in the same manner as the 16 RI/FS sites so SSAs closest to the border of the facility will be investigated first. The order for the SSA investigations is:

- SSAs 1, 6, 7, and 15 - Field activities completed during December, 1994
- SSAs 2, 17, 18, and 19 - Field activities will commence in February, 1995
- SSAs 8, 11, 12, and 13
- SSAs 4, 5, and 10
- SSAs 3, 9, and 14

SECTION 4.0 FIGURES

FIGURE 4-1

KEY DECISION POINTS DURING THE SITE SCREENING AND RI/FS PROCESSES



(1) Steps taken following the Removal Action will depend on the point at which the action is taken during the site screening and RI/FS processes.

SECTION 4.0 TABLES

TABLE 4-1

SUMMARY OF INITIAL RATIOS AND ANSWERS TO QUALITATIVE QUESTIONS
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

SITE NO.	Groundwater				Soil				Sediment			Surface Water		
	CAR	NON	RF	MPF	CAR	NON	RF	MPF	ECO	RF	MPF	ECO	RF	MPF
1	7,293.33	17.30	c	a	24.50	0.37	b	c	13.14	a	b	98.75	a	b
2	2,437.02	14.05	c	b	--	--	--	--	36.59	a	a	7.02	a	a
3	1,307.48	75.51	c	a	6.02	0.50	b	b	--	--	--	1.00	a	b
4	1,464.11	35.63	c	a	25.43	4.00	b	b	681.62	a	a	543.58	a	a
5	--	--	--	--	14.00	--	b	c	--	--	--	--	--	--
6	333.25	7.16	c	b	6.81	0.11	b	b	44.57	a	a	47.13	a	b
7	5,573.82	68.65	c	b	4.12	0.47	b	b	23.58	a	b	67.70	a	b
8	313.20	8.83	c	b	4.19	0.20	b	b	15.48	a	b	10.49	a	b
9	1,290.90	119.91	c	a	24.08	1.85	b	b	296.06	a	b	6.19	a	a
11	1,890.51	7.28	c	b	--	0.03	b	b	1.20	a	b	238.40	a	b
12	34.18	29.55	c	a	52.90	6.26	b	b	815.65	a	b	508.59	a	a
16	776.92	25.66	c	a	13.24	2.21	b	b	6.55	a	b	391.05	a	b
17	2,470.95	23.60	c	b	71.69	2.23	c	b	--	--	--	--	--	--
18	378.67	74.62	c	c	--	--	b	c	7.88	a	b	16.61	a	b
19	0.03	20.16	c	a	35.49	3.24	b	a	248.14	a	a	--	--	--
21	1,033.04	166.10	c	b	31.11	4.30	a	b	--	--	--	--	--	--

Notes: CAR Carcinogenic values
NON Noncarcinogenic values
ECO Ecological values
RF Receptor factor
MPF Migration pathway factor
-- Not detected or not analyzed

a, b, c - defined on pages 4-6 and 4-7

TABLE 4-2

ADJUSTED RISK RATIOS PER MEDIA
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

SITE NO.	Groundwater		Soil		Sediment	Surface Water
	adj-CAR	adj-NON	adj-CAR	adj-NON	adj-ECO	adj-ECO
1	72,933.33	172.97	244.97	1.85	657.00	4,937.50
2	12,185.10	70.25	--	--	3,659.00	702.00
3	13,074.80	751.10	301.00	12.50	--	50.00
4	14,641.10	356.30	1,271.50	99.98	68,162.00	54,358.20
5	--	--	140.00	--	--	--
6	1,666.25	35.80	340.50	2.75	4,457.20	2,356.50
7	27,869.10	343.25	206.15	11.75	1,178.75	3,385.35
8	1,566.02	44.15	209.65	5.10	774.05	524.25
9	12,908.96	1,199.10	1,204.20	46.25	14,802.80	619.00
11	9,452.55	36.40	--	0.75	60.00	11,919.85
12	341.80	295.50	2,645.20	156.50	40,782.50	50,859.30
16	7,769.20	256.60	661.85	55.25	327.50	19,552.40
17	12,354.75	117.99	358.45	11.15	--	--
18	378.67	74.62	--	--	393.85	830.25
19	0.30	201.60	3,549.30	161.95	24,814.10	--
21	5,165.20	830.48	15,555.00	215.00	--	--

Notes:
adj-CAR Adjusted carcinogenic values
adj-NON Adjusted noncarcinogenic values
adj-ECO Adjusted ecological values
-- Not detected or not analyzed

TABLE 4-3

SUMMARY OF TOTAL ADJUSTED RISK RATIOS
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

SITE NUMBER	CARCINOGENS	NONCARCINOGENS	ECOLOGICAL
1	73,178	175	5,594
2	12,185	70	4,361
3	13,376	768	50
4	15,913	456	122,520
5	140	--	--
6	2,007	39	6,814
7	28,075	355	4,564
8	1,776	49	1,298
9	14,113	1,245	15,422
11	9,453	37	11,980
12	2,987	452	91,642
16	8,431	312	19,880
17	12,713	129	--
18	379	75	1,224
19	3,550	364	24,814
21	20,720	1,045	--

-- Not detected or not analyzed

TABLE 4-4

SITE RANKING
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Site Number	Ranking						Sum of Rank	Sites in Order of Rank
	CAR	Norm. CAR	NON	Norm. NON	ECO	Norm. ECO		
1	16	16	7	7	6	7	30	**Site 4 (42)**
2	9	9	4	4	4	5	18	**Site 9 (39)**
3	11	11	13	14	1	1	26	**Site 12 (32)**
4	13	13	12	13	13	16	42	**Site 7 (31)**
5	1	1	--	0	--	0	1	**Site 19 (31)**
6	4	4	2	2	7	9	15	**Site 1 (30)**
7	15	15	9	10	5	6	31	**Site 21 (29)**
8	3	3	3	3	3	4	10	**Site 16 (28)**
9	12	12	15	16	9	11	39	**Site 3 (26)**
11	8	8	1	1	8	10	19	**Site 11 (19)**
12	5	5	11	12	12	15	32	**Site 2 (18)**
16	7	7	8	9	10	12	28	**Site 17 (16)**
17	10	10	6	6	--	0	16	**Site 6 (15)**
18	2	2	5	5	2	2	9	**Site 8 (10)**
19	6	6	10	11	11	14	31	**Site 18 (10)**
21	14	14	14	15	--	0	29	**Site 5 (1)**

Notes: CAR Ranking of carcinogenic scores
NON Ranking of noncarcinogenic scores
ECO Ranking of ecological scores
Norm. Normalized scores
-- Not detected or not analyzed

5.0 SITE MANAGEMENT PLAN SCHEDULES

This section presents the project schedules for the sites and SSAs identified in Section 2.0 and prioritized in Section 4.0. Schedules depicting the major project activities for each site and SSA are provided. In addition, specific submittal deadlines planned for fiscal years 1995 and 1996 have been developed. Appendix B presents sites and SSAs that have or will undergo removal actions. Appendix C presents the detailed schedules for activities that were funded in FY 1994/1995. Appendix D presents detailed schedules for those activities funded during FY 1995/1996 For sites potentially undergoing RI, BRA, or FS activities in FY 1996/1997, detailed master schedules are included in Appendix E. Appendix F presents summary schedules, including target dates, for all activities scheduled to begin after FY 1997.

5.1 Scheduling Assumptions

Assumptions regarding document review periods and deviations from the FFA are discussed in the following sections.

5.1.1 Federal Facility Agreement Assumptions

RI/FS and RD/RA deliverables are classified as "primary" or "secondary" documents in the FFA, as shown in Table 5-1. A primary document is typically a major, discrete portion of an RI/FS or RD/RA activity, whereas a secondary document may be a discrete portion of a primary document or may serve as a feeder document to a primary document. The project schedules have been developed using the primary and secondary document review and comment process specified in the FFA. This process is summarized in Table 5-2.

The time required for review will vary according to the length and complexity of the document. In an effort to expedite document finalization, the draft document review period has been decreased from the FFA 60-day duration to a 30-day period for the secondary documents listed below:

- Treatability Study Work Plan
- Treatability Study Report

- Engineering Evaluation/Cost Analysis Report
- Removal Action Memorandum

These secondary documents are expected to be short in length and relatively straightforward in nature compared to the other primary and secondary documents.

5.1.2 Document Preparation, Field Investigation, and Sample Analysis/Validation Assumptions

Durations for work plan preparation and field investigation activities have been based on the available information for the sites, while taking into account the overall complexity of each area (e.g., size, media types, potential receptors, proximity to other sites). The sampling efforts needed to support RI/FS activities (i.e., required to fill existing risk-, hydrogeologic-, and engineering-related data gaps) were also taken into account. These factors will be more thoroughly evaluated during development of the work plans.

Work Plan development, field investigation, and sample analysis/validation activities for the sites and SSAs have been combined to optimize coordination of these efforts (e.g., document review, field mobilization/demobilization, database management). The site/SSA groupings and estimated work plan (both RI and SSP) and field investigation durations are summarized in Table 5-3.

The work plan durations represent the estimated time required to generate the first draft document (referred to as the Preliminary Draft). The field investigation durations include the time required for subcontractor procurement and mobilization of equipment and personnel.

With respect to sample analysis, a 30-day duration was assumed for all laboratory analyses, which is the standard turnaround time for the NEESA-approved laboratories currently under contract with Baker Environmental, Inc. (Baker). For data validation, a 15-day duration was assumed for all analytical data, which is also the standard turnaround time for the data validation firms currently under contract with Baker.

For preparation of other RI/FS and RD/RA documents, "typical" or "average" durations were assumed based on prior experience in preparing these reports. Assumptions concerning document preparation are outlined in Table 5-4. More accurate estimates of document preparation times can be made in subsequent SMPs as more data become available; estimates will be updated in each site-specific work plan.

5.2 Site Management Plan (SMP) Schedules

This section presents the proposed activities and schedules for the sites and SSAs identified in Section 2.0 and prioritized in Section 4.0 of the SMP. Figure 5-1 presents the overall schedules for completion of activities through FY 2000. Appendix B presents the schedules for the planned removal actions for FY 1994/1995 and FY 1995/1996. Detailed SMP schedules for the RI/FS/RD activities are presented in Appendix C for work beginning at the sites and SSAs in 1994 and FY 1995. Appendix C also contains schedules for work completed in 1994 but funded during the 1993/1994 fiscal year. Appendix D presents detailed SMP schedules for RI/FS/RD activities beginning at sites and SSAs in FY 1995 and 1996. Appendix D also presents a detailed schedule for the WES treatability study work (Figure D-7). Schedules for projects that started in FY 1994 for which schedule modifications have occurred are also included in Appendix D. Appendix E presents detailed schedules for those activities beginning in FY 1996/1997.

The basic strategy employed during development of the SMP schedules was to overlap the RI/FS and RD/RA activities to the maximum extent practicable in order to compress the entire project schedule as much as possible. The amount of overlap was based on the degree of dependency between the various tasks and documents. Key dependencies and related assumptions are outlined below.

- Remedial Investigation: Preparation of the Preliminary Draft RI was assumed to start once all the analytical data are received prior to completion of data validation. Certain RI tasks can begin before the data are validated; to prevent duplication of effort, this overlap was assumed to be two weeks.

- Feasibility Study: Many FS tasks are dependent on the nature and extent of contamination which is determined in the RI document. Preparation of the Preliminary Draft FS was assumed to start approximately one month following the start of the RI.

- Proposed Plan: Preparation of the Preliminary Draft Proposed Plan was assumed to start at the same time as work on the FS. As comments are received from USEPA and the State on the FS, modifications to the PRAP will be made concurrently.

- Public Commend Period: The 45 day public comment period on the PRAP will begin when the final PRAP is submitted. Public comments on the PRAP can then be considered and addressed in the Responsiveness Summary section of the ROD.

- Record of Decision: Preparation of the ROD will generally begin approximately two months after the start of the FS and PRAP. The final ROD will incorporate all public comments received during the Public Comment Period.

- Remedial Design: The RD was assumed to start following finalization of the ROD since concurrence with the selected alternative(s) must be obtained before design activities can begin.

5.2.1 Proposed Removal Actions

Removal actions are currently planned for SSAs 3 and 7 in FY 1995.

The removal action planned for SSA 3 involves removal of the fire training pits. The removal action at SSA 7 involves removal of surficial source material(s). Schedules for these removal actions are presented in Appendix B.

In addition to removals at SSAs 3 and 7, removal activities for SSAs 17 and 18 will continue.

5.2.2 RI/FS and RD/RA Schedules

The prioritization of remedial investigation activities at the 16 RI/FS sites and the site screening process activities at the 19 SSAs has been presented in Section 4.0. Tables 5-5 and 5-6 present deadlines and target dates for FY 1995 and FY 1996 RI/FS PRAP, ROD, RD, and associated activities. Appendix D and Appendix E presents detailed schedules, including submittal deadlines and target dates, for the activities beginning in FY 1995 and FY 1996 through their completion. As stated previously, these schedules have been updated to address changes in the FY 1994/1995 schedules, as appropriate. Schedules will also be updated in the specific work plans designed for each site.

5.2.3 Treatability Study Schedule

Treatability studies are planned for nitramine-contaminated soils present at Sites 6, 7, 9, and 19 to support selection of a remedial technology, should remedial action be required for these and other explosives contaminated sites. The proposed schedule for treatability studies being conducted by the U.S. Army Corps of Engineers Waterways Experiment Station (WES) in Vicksburg, Mississippi is presented in Appendix D, in Figure D-7. A Draft Treatability Study Work Plan has been completed by WES and is under regulatory review.

Treatability studies using white rot fungus will also be conducted by Mycotech Corporation beginning in FY 1995 and concluding in FY 1996. Schedules are, however, not currently available for this treatability study. Schedules for the white rot studies will be provided in the FY 96/97 SMP.

WES, Navy, USEPA Region III, and Baker personnel selected the following remediation technologies for investigation by WES using bench scale reactors:

- Anaerobic Bioslurry
- Anaerobic Biocell
- Aerobic Bioslurry
- Aerobic Biocell
- Slurry Oxidation (SlurOx)

The WES treatability study is divided into seven phases that entail soil sample selection and preparation (Phase I), microbial systems evaluation (Phase II), desorption enhancement evaluation using surfactants (Phase III), bioslurry bench studies and biocell bench studies (Phases IV and V), slurox bench studies (Phase VI) and report preparation (Phase VII). Phase I is expected to take approximately 2 months. Phases II and III will be performed concurrently and should take 3 months to complete. Phase IV will take an additional 4 months to complete. Phases V and VI will run concurrently with Phase IV. Finally, Phase VII is expected to take one month for an accumulative time requirement of 10 months.

WES will also provide monthly updates to the Navy during the 10-month treatability study. Baker will compile the monthly progress reports and generate three quarterly reports for USEPA Region III and Commonwealth of Virginia review while the treatability study is ongoing. Quarterly reports will allow for the evaluation of each technology and, should these technologies prove to be effective, FS reports will be developed to implement one of the technologies. If one of the bioremediation technologies is selected as a remedial alternative for one of the explosives contaminated sites, a ROD will be developed that identifies one of the bioremediation technologies as the remedial alternative and a proven technology as a backup alternative. A pilot scale study for the selected technology will be proposed during the design phase and will be necessary to determine how bioremediation technologies may be affected by site specific conditions. Sites for which bioremediation technologies will be proposed first include Sites 9 and 19. FS reports for Sites 9 and 19 closely coincide with the issuance of the WES draft treatability study report in early 1996.

5.2.4 Presumptive Remedies

Presumptive remedies are preferred technologies for common categories of sites based on historical patterns of remedy selection and USEPA's scientific and engineering evaluation of performance data on technology implementation. The objective of presumptive remedies is to use past agency experience to streamline site investigation and speed up selection of cleanup actions by eliminating the need for the initial identification and screening of alternatives during the FS.

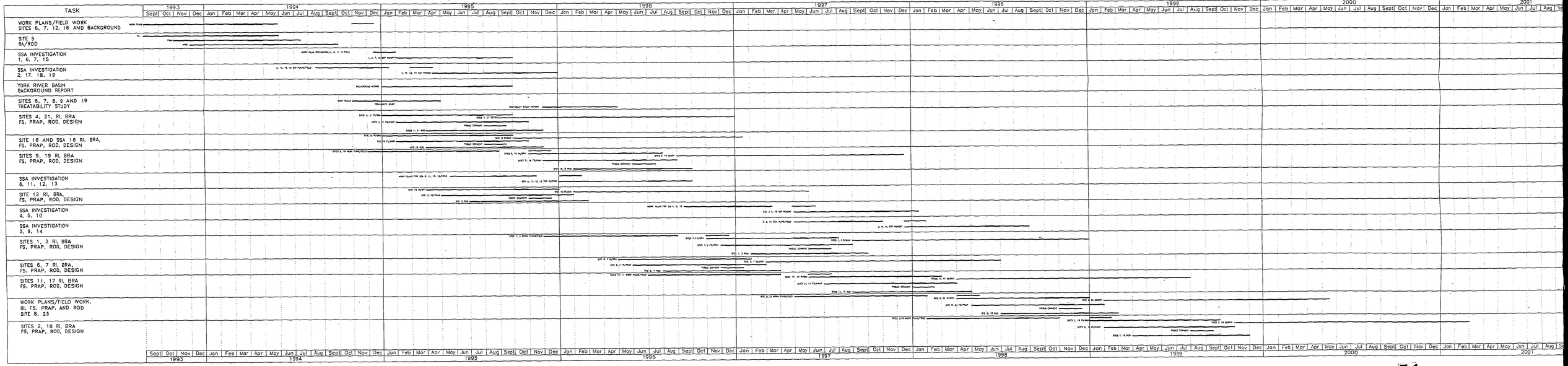
Presumptive remedies evolve from the expectation that containment will be the likely focus at sites having wastes that pose relatively low, long-term threats or where treatment is impracticable.

Presumptive remedies typically apply to municipal and CERCLA landfills as types of sites where treatment of the waste may be impractical because of their size and the heterogeneity of their contents.

Several sites at WPNSTA, Yorktown have been identified as candidate sites for presumptive remedies in FY 1995 and FY 1996. These sites include Site 1, the former Dudley Road Landfill; Site 4, the Weapons Casing/Drum Disposal Area; and Site 21, the Battery and Drum Disposal Area.

RI activities are currently underway for Sites 4 and 21, and variables which could complicate the use of presumptive remedies will be addressed by June of 1995. The potential use of a presumptive remedy at Site 1 will also be evaluated in FY 1995, or early FY 1996.

SECTION 5.0 FIGURES


TASK
1993
1994
1995
1996
1997
1998
1999
2000
2001
Sept Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec
WORK PLANS/FIELD WORK SITES 6, 7, 12, 16 AND BACKGROUND
SITE 5 RA/ROD
SSA INVESTIGATION 1, 6, 7, 15
SSA INVESTIGATION 2, 17, 18, 19
YORK RIVER BASIN BACKGROUND REPORT
SITES 6, 7, 8, 9 AND 19 TREATABILITY STUDY
SITES 4, 21, RI, BRA FS, PRAP, ROD, DESIGN
SITE 16 AND SSA 16 RI, BRA, FS, PRAP, ROD, DESIGN
SITES 9, 19 RI, BRA FS, PRAP, ROD, DESIGN
SSA INVESTIGATION 8, 11, 12, 13
SITE 12 RI, BRA, FS, PRAP, ROD, DESIGN
SSA INVESTIGATION 4, 5, 10
SSA INVESTIGATION 3, 9, 14
SITES 1, 3 RI, BRA FS, PRAP, ROD, DESIGN
SITES 6, 7 RI, BRA, FS, PRAP, ROD, DESIGN
SITES 11, 17 RI, BRA FS, PRAP, ROD, DESIGN
WORK PLANS/FIELD WORK, RI, FS, PRAP, AND ROD SITE 8, 23
SITES 2, 18 RI, BRA FS, PRAP, ROD, DESIGN

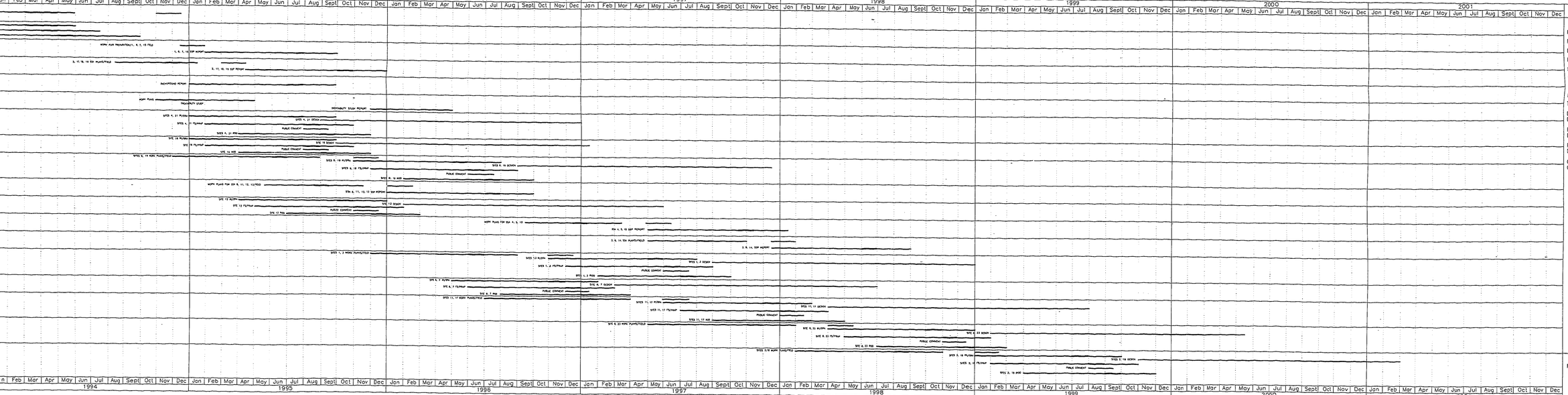


FIGURE 5-1
PROJECTED OVERALL SCHEDULE FOR ACTIVITIES AT SITE SCREENING AREAS AND INSTALLATION RESTORATION PROGRAM SITES
NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA

F 2

SECTION 5.0 TABLES

TABLE 5-1

PRIMARY AND SECONDARY DOCUMENTS AS DEFINED IN THE FFA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Primary Documents	Secondary Documents
Site Screening Process Work Plans	Health and Safety Plans
Site Screening Process Reports	Non-Time Critical Removal Action Plans
RI/FS and FFS Work Plans	Pilot/Treatability Study Work Plans
Remedial Investigation Reports	Pilot/Treatability Study Reports
FS and FFS Reports	N/A
Proposed Plans	Engineering Evaluation/Cost Analysis Reports
	Well Closure Methods and Procedures
Final Remedial Designs	N/A
Remedial Action Work Plans • Remedial Action Sampling Plan • Remedial Action Construction Quality Assurance Plan • Remedial Action Environmental Monitoring Plan	Preliminary Conceptual Design or Equivalent Documents
Remedial Action Completion Reports	Prefinal Remedial Designs
Operation and Maintenance Plans	Periodic Review Assessment Reports
Site Management Plan	Removal Action Memorandums
Community Relations Plan (for submission only)	N/A
Long-Term Remedial Action Monitoring Plan (for submission only)	N/A

RI/FS = Remedial Investigation/Feasibility Study
FFS = Focused Feasibility Study
N/A = Not Applicable

TABLE 5-2

PRIMARY AND SECONDARY DOCUMENT REVIEW PROCESS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Primary Document	Review Duration	Secondary Document	Review Duration
Draft Document	60 Days	Draft Document	60 Days
Incorporation of Comments	60 Days*	Incorporation of Comments	30 Days
Draft Final Document	30 Days**	N/A	
Final Document		Final Document	

N/A - Not Applicable

* Although the FFA provides 60 days for the incorporation of comments on draft documents, schedules presented herein provide 30 days. Thirty days is considered to be sufficient for incorporation of EPA/State comments.

** If comments are adequately addressed in the draft final document, the final document will be submitted one week following receipt of USEPA's and Commonwealth of Virginia's "No additional comments at this time" letter.

TABLE 5-3

ESTIMATED WORK PLAN AND FIELD INVESTIGATION DURATIONS FOR SITES AND SSAs
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

SITE NO.	WORK PLAN DURATION (MONTHS)	FIELD INVESTIGATION (MONTHS)	SSA NO.	WORK PLAN DURATION (MONTHS)	FIELD INVESTIGATION (MONTHS)
6, 7, 12, 16, SSA 16	2	5	1, 6, 7, 15	1.5	1.5
9, 19	2	2	2, 17, 18, 19	1.5	1.5
1, 3	2	2	8, 11, 12, 13	1.5	1.5
4, 21	2	2	4, 5, 10	1.5	1.5
2, 18	2	2	3, 9, 14	1.5	1.5
11, 17	2	2			
8, 23	2	2			

Notes: For all SSAs, a geophysical investigation was assumed to occur during work plan development to aid in the selection of sample locations.

TABLE 5-4

DOCUMENT PREPARATION DURATIONS
NAVAL WEAPONS STATION YORKTOWN,
YORKTOWN, VIRGINIA

Document	Duration (Months) [1]
Site Screening Area Report	2
Remedial Investigation Report	2
Feasibility Study	2
Proposed Plan	2
Record of Decision	1
Draft Remedial Design/Work Plans	5
Prefinal Remedial Design/Work Plan	2
Final Design/Work Plan	2
Engineering Evaluation/Cost Analysis	2
Removal Action Memorandum	1
30% Removal Action Design	1
90% Removal Action Design	2
Final Removal Action Design	1
Treatability Study Work Plan	2
Treatability Study Report	1

[1] Durations represent estimated time required to complete Preliminary Draft Documents.

TABLE 5-5

LIST OF DEADLINES AND TARGET DATES FOR FISCAL YEAR 1995
WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Deliverable	CTO Number	Preliminary Draft	Navy Review Complete By	Draft	EPA/State Review Complete By	Draft Final	EPA/State Review Complete By	Final
95/96 Site Management Plan	229	4/15/94	5/16/94	6/16/94	8/15/94	9/30/94	10/29/94	2/3/95
SSAs 2,17,18,19 Work Plan	267	NA	NA	9/15/94	11/14/94	12/15/94	1/11/95	(2/10/95)*
WES Bench-Scale Treatability Study Work Plan	209	11/1/94	1/9/95	1/13/95	1/25/95	NA	NA	2/8/95
Sites 9 & 19 Field Investigation Work Plans	292	2/13/95	3/1/95	3/31/95	5/29/95	6/28/95	7/28/95	8/25/95
EE/CA Report SSAs 3 & 7	294	NA	NA	3/17/94	4/17/95	NA	NA	5/1/95
Removal Action Memorandum SSAs 3 & 7	294	NA	NA	4/1/95	4/17/95	NA	NA	5/1/95
Removal Action Design SSAs 3 & 7	294	NA	NA	3/28/95	4/11/95	NA	NA	5/1/95
RI Report Site 16 & SSA16	291	2/23/95 **	3/23/95	4/21/95	6/21/95	7/22/95	8/21/95	9/20/95
RI Report Sites 4 & 21	297	2/20/95 **	3/23/95	4/22/95	6/22/95	7/23/95	8/21/95	9/22/95
York River Background Report	252	3/1/95	3/31/95	5/1/95	6/29/95	7/28/95	8/28/95	9/26/95
SSAs 1,6,7,15 SSP Report	228	3/15/95	4/14/95	5/15/95	7/10/95	8/15/95	9/15/95	10/13/95
FS Report and PRAP Site 16 & SSA 16	291	3/22/95	4/21/95	5/22/95	7/21/95	8/21/95	9/20/95	10/20/95
FS Report and PRAP Sites 4 & 21	297	3/27/95	4/25/95	5/26/95	7/26/95	8/25/95	9/24/95	10/24/95
ROD Site 16 & SSA 16	291	4/22/95	5/20/95	6/20/95	8/19/95	9/19/95	10/19/95	11/20/95
96/97 Site Management Plan	306	4/14/95	5/15/95	6/14/95	8/14/95	9/13/95	10/13/95	1/15/96
SSAs 2,17,18,19 SSP Report	302	5/30/95	6/29/95	7/31/95	9/29/95	10/30/95	11/29/95	12/29/95
RI Report Site 12	311	5/31/95	6/30/95	7/31/95	9/29/95	10/30/95	11/29/95	12/29/95
ROD Sites 4 & 21	297	5/23/95	6/22/95	7/24/95	9/21/95	10/21/95	11/20/95	12/20/95
SSAs 8,11,12,13 Work Plans		NA	NA	6/15/95	8/16/95	9/15/95	10/16/95	11/15/95
FS Report and PRAP Site 12	311	6/29/95	7/31/95	8/30/95	10/30/95	11/29/95	12/29/95	1/29/96
ROD Site 12	311	8/30/95	9/29/95	10/30/95	12/29/95	1/29/96	2/28/96	3/29/96

Notes:

* - Report will be submitted as final 14 days after receipt of all agency comments. The projected deliverable date is provided.

** - Modifications to these dates may be necessary to incorporate removal action data.

NA - Not Applicable

CTO - Contract Task Order. Deliverables having CTO numbers are funded.

TABLE 5-6

LIST OF DEADLINES AND TARGET DATES FOR FISCAL YEAR 1996
WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Deliverable	CTO Number	Preliminary Draft	Navy Review Complete By	Draft	EPA/State Review Complete By	Draft Final or Pre-Final	EPA/State Review Complete By	Final
WES Bench-Scale Treatability Study Report	209	1/5/96	1/9/96	1/23/96	2/22/96	NA	NA	2/8/95
Remedial Design Site 16 & SSA 16		NA	NA	3/1/96	5/1/96	6/28/91	8/27/96	10/25/96
Remedial Design Sites 4 & 21		NA	NA	4/15/96	6/14/96	8/13/96	10/11/96	12/10/96
RI Report Sites 9 & 19		1/2/96	2/1/96	3/1/96	4/1/96	5/31/96	7/1/96	8/1/96
FS Report and PRAP Sites 9 & 19		2/1/96	3/1/96	4/1/96	5/31/96	7/1/96	8/1/96	9/2/96
SSAs 8, 11, 12, 13 Report		3/16/96	4/15/96	5/15/96	7/14/96	8/13/96	9/12/96	10/14/96
ROD Sites 9 & 19		3/1/96	4/1/96	5/1/96	7/1/96	7/31/96	8/30/96	9/30/96
Work Plan Sites 1* & 3		2/1/96	3/1/96	4/1/96	5/31/96	7/1/96	8/1/96	9/2/96
RI Report Sites 6 & 7		7/1/96	8/1/96	9/2/96	11/1/96	12/2/96	1/2/97	2/3/97
Remedial Design Site 12		NA	NA	7/15/96	9/13/96	11/12/96	1/13/97	3/13/97
FS Report and PRAP Sites 6 & 7		8/1/96	9/2/96	10/2/96	12/2/96	1/2/97	2/3/97	3/5/97
ROD Sites 6 & 7		10/1/96	10/31/96	11/29/96	1/28/97	2/28/97	3/28/97	4/29/97
Work Plan Sites 11 &17		9/2/96	10/1/96	11/1/96	1/2/97	2/1/97	3/4/97	4/4/97
Work Plan SSAs 4, 5, 10		NA	NA	9/16/96	11/15/96	12/16/96	1/14/97	2/13/97

Notes:

* - Site 1 may be evaluated as a presumptive remedy in FY 1995
NA - Not Applicable
CTO - Contract Task Order. Deliverables having CTO numbers are funded.

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APPENDIX A
QUANTITATIVE SITE RANKING
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

APPENDIX A

QUANTITATIVE SITE RANKING
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

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APPENDIX A-1
SITE 1 - DUDLEY ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Trichloroethane,1,1,2-	28	0.3	93.33
Trichloroethene	18,000	2.5	7,200.00
TOTAL			7,293.33
NONCARCINOGENIC			
Aluminum	10,500	36,500	0.29
Cadmium	5.9	18.3	0.32
Dichloroethene,1,2-	1,000	69.2	14.45
Manganese	355	182.5	1.95
Nitrates	8,200	58,400	0.14
Zinc	1,650	10,950	0.15
TOTAL			17.30

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	24.3	1.0	24.30
Bis(2-ethylhexyl)phthalate	12	60.8	0.20
TOTAL			24.50
NONCARCINOGENIC			
Copper	5.9	2,905.1	0.002
Lead	21.4	500	0.04
Manganese	127	391.1	0.32
Zinc	29.3	23,464.3	0.001
TOTAL			0.37

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	11.2	2	5.60
Chromium	89.6	80	1.12
Nickel	162	30	5.40
Zinc	122	120	1.02
TOTAL			13.14

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	31	12	2.58
Lead	278	3.2	86.88
Mercury	0.11	0.012	9.17
Nickel	20.3	160	0.13
TOTAL			98.76

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-2
SITE 2 - TURKEY ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	110	0.048666	2,260.30
Beryllium	3.5	0.019806	176.71
TOTAL			2,437.01
NONCARCINOGENIC			
Aluminum	35,800	36,500	0.98
Barium	197	2,555	0.08
Cadmium	4.5	18.3	0.25
Lead	20.9	4	5.23
Manganese	1,360	182.5	7.45
Nickel	34.8	730	0.05
Nitrates	470	58,400	0.008
Zinc	136	10,950	0.01
TOTAL			14.06

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Arsenic	11.7	33	0.36
Cadmium	2.4	5	0.48
Chromium	44.5	80	0.56
Copper	10.7	70	0.15
DDE	0.003	0.002	1.50
Lead	19	35	0.54
Mercury	0.11	0.15	0.73
Nickel	21.2	30	0.71
Silver	28.4	1	28.40
Zinc	116	120	0.97
TOTAL			34.40

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	5.2	190	0.03
Cadmium	4.1	1.1	3.73
Copper	7.7	12	0.64
Lead	7.9	3.2	2.47
Nickel	24.7	160	0.15
TOTAL			7.02

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 22.5 ug/l; however, the value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-3
SITE 3 - GROUP 16 MAGAZINE LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	23.3	0.019806	1,176.41
Chloroform	29	0.3	96.67
Trichloroethene	86	2.5	34.40
TOTAL			1,307.48
NONCARCINOGENIC			
Aluminum	202,000	36,500	5.53
Antimony	44	14.6	3.01
Barium	1,220	2,555	0.48
Cadmium	29.7	18.3	1.62
Dichloroethene,1,2-	61	69.2	0.88
Lead	146	4	36.50
Manganese	4,810	182.5	26.36
Mercury	0.54	10.9	0.05
Nickel	594	730	0.81
Zinc	2,840	10,950	0.26
TOTAL			75.50

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	6	1.0	6.00
Chromium	18.4	938.9	0.02
TOTAL			6.02
NONCARCINOGENIC			
Copper	7.3	2,905.1	0.003
Lead	24.4	500	0.05
Manganese	171	391.1	0.44
Nickel	8.6	1,564.3	0.005
Zinc	67.4	23,464.3	0.003
TOTAL			0.50

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Surface Water
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	12	12	1.00
TOTAL			1.00

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-4
SITE 4 - BURNING PAD RESIDUE LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	20.6	0.048666	423.29
Beryllium	20.2	0.019806	1,019.89
Dichloroethene, 1,1-	1	0.1	10.00
RDX	3.3	0.8	4.13
Trichloroethene	17	2.5	6.80
TOTAL			1,464.11
NONCARCINOGENIC			
Aluminum	70,800	36,500	1.94
Antimony	45.7	14.6	3.13
Barium	287	2,555	0.11
Cadmium	5.2	18.3	0.28
Dichloroethene,1,2-	20	69.2	0.29
HMX	1.1	1,825	0.001
Lead	49.2	4	12.30
Manganese	3,140	182.5	17.21
Mercury	0.19	10.9	0.02
Nickel	209	730	0.29
Trichloroethane,1,1,1-	2	1,506	0.001
Zinc	735	10,950	0.07
TOTAL			35.64

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1254	0.044	0.1	0.44
Arsenic	6.9	1	6.90
Benzo(a)pyrene	0.9	0.1	9.00
Benzo(b)fluoranthene	1.4	1.2	1.17
Benzo(k)fluoranthene	0.95	1.2	0.79
Beryllium	0.35	0.4	0.88
Bis(2-ethylhexyl)phthalate	5.3	60.8	0.09
Chromium	10.6	938.9	0.01
Methylene Chloride	0.086	22.3	0.004
RDX	47	7.7	6.10
Trinitrotoluene,2,4,6-	92.6	1703.3	0.05
TOTAL			25.44
NONCARCINOGENIC			
Aluminum	52,700	78,214.3	0.67
Antimony	62.5	31.3	2.00
Barium	91.8	5,475	0.02
Cadmium	4.7	39.1	0.12
Dinitrotoluene,2,4-	0.43	78.2	0.005
Fluoranthene	2	1,564.3	0.001
HMX	58	1,955.4	0.03
Lead	135	500	0.27
Manganese	312	391.1	0.80
Mercury	1.4	23.5	0.06
Nickel	7.9	1,564.3	0.005
Trichloroethane,1,1,1-	0.023	300	0.00007
Zinc	540	23,464.3	0.02
TOTAL			4.00

Notes: PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	43.1	2	21.55
Arsenic	9.7	33	0.29
Cadmium	2.99	5	0.60
Chlordane, alpha	0.04	0.0005	80.00
Chlordane, gamma	0.033	0.0005	66.00
Chromium	30.6	80	0.38
Copper	33.6	70	0.48
DDD	0.91	0.002	455.00
DDE	0.056	0.002	28.00
DDT	0.015	0.001	15.00
Lead	32.5	35	0.93
Mercury	0.34	0.15	2.27
Nickel	33.6	30	1.12
Zinc	1,200	120	10.00
TOTAL			681.62

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Antimony	44.1	30	1.47
Arsenic	43.4	190	0.23
Beryllium	2.2	5.3	0.42
Cadmium	11.6	1.1	10.55
Chromium	46	210	0.22
Dinitrotoluene,2,4-	0.44	230	0.002
Lead	215	3.2	67.19
Mercury	5.56	0.012	463.33
Nickel	29	160	0.18
TOTAL			543.59

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Nitramine compounds were detected at high concentrations (i.e., HMX at 19 ug/l; RDX at 170 ug/l; 1,3,5-TNB at 2.6 ug/l; 1,3-DNB at 0.34 ug/l; nitrobenzene at 0.38 ug/l; 2,4,6-TNT at 8.3 ug/l; and 2,4-DNT at 0.44 ug/l). There is no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Zinc was detected in the surface water at this site at a concentration of 3,880 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-5
SITE 5 - SURPLUS TRANSFORMER STORAGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Soil
Site 5 - Surplus Transformer Storage Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1260	1.4	0.1	14.00
TOTAL			14.00

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic values.

APPENDIX A-6
SITE 6 - EXPLOSIVES-CONTAMINATED WASTEWATER IMPOUNDMENT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Dichloroethene,1,1-	16	0.1	160.00
RDX	17	0.8	21.25
Trichloroethene	380	2.5	152.00
TOTAL			333.25
NONCARCINOGENIC			
Antimony	57.2	14.6	3.92
Cadmium	4.5	18.3	0.25
Dichloroethene,1,2-	86	69.2	1.24
HMX	7.6	1,825	0.004
Manganese	319	182.5	1.75
TOTAL			7.16

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	6.4	1.0	6.40
Bis(2-ethylhexyl)phthalate	0.45	60.8	0.007
Chromium	25.1	938.9	0.03
RDX	2.9	7.7	0.38
TOTAL			6.82
NONCARCINOGENIC			
Copper	5.5	2,905.1	0.002
HMX	5.6	1,955.4	0.003
Lead	50.3	500	0.10
Zinc	214	23,464.3	0.009
TOTAL			0.11

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	48.2	2	24.10
Benzo(a)pyrene	0.31	0.4	0.78
Cadmium	9.8	5	1.96
Chromium	94.8	80	1.19
Copper	130	70	1.86
Fluoranthene	0.84	0.6	1.40
Lead	68.1	35	1.95
Nickel	100	30	3.33
Pyrene	0.93	0.35	2.66
Zinc	643	120	5.36
TOTAL			44.59

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Volatile and nitramine compounds were detected at very high concentrations (i.e., TCE at 180 mg/kg; 1,1,1-TCA at 190 mg/kg; HMX at 710 mg/kg; RDX at 160 mg/kg). There are no sediment quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Quantitative Site Ranking - Surface Water
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Chromium	61.2	210	0.29
Copper	50.3	12	4.19
Lead	78.8	3.2	24.63
Mercury	0.21	0.012	17.50
Nickel	84.2	160	0.53
TOTAL			47.14

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Nitramine compounds were detected at high concentrations (i.e., HMX at 12 ug/l; RDX at 33 ug/l; 2,4,6-TNT at 36 ug/l). There are no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

APPENDIX A-7
SITE 7 - PLANT 3 EXPLOSIVES-CONTAMINATED WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	18	0.01981	908.63
Dichloroethene,1,1-	160	0.1	1,600.00
Dinitrotoluene,2,6-	19	0.1	190.00
RDX	2,300	0.8	2,875.00
TOTAL			5,573.63
NONCARCINOGENIC			
Aluminum	126,000	36,500	3.45
Cadmium	12.6	18.3	0.69
Dichloroethane,1,1-	58	1,006.9	0.06
HMX	190	1,825	0.10
Lead	61	4	15.25
Manganese	6,790	182.5	37.21
Mercury	0.23	10.9	0.02
Nickel	328	730	0.45
Nitrobenzene	0.59	18.3	0.03
Trichloroethane,1,1,1-	9,900	1,506	6.57
Trinitrobenzene,1,3,5-	8.5	1.8	4.72
Zinc	985	10,950	0.09
TOTAL			68.64

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	2.1	1.0	2.10
Beryllium	0.8	0.4	2.00
Bis(2-ethylhexyl)phthalate	0.53	60.8	0.009
TOTAL			4.11
NONCARCINOGENIC			
Chromium	13.6	391.1	0.03
Manganese	181	391.1	0.46
Nickel	9.1	1,564.3	0.006
Zinc	31.9	23,464.3	0.001
TOTAL			0.50

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	30.4	2	15.20
Cadmium	5.8	1.16	1.16
Copper	79.4	1.13	1.13
Lead	95.3	35	2.72
Zinc	403	120	3.36
TOTAL			23.57

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Chromium	77.8	210	0.37
Copper	137	12	11.42
Lead	114	3.2	35.63
Mercury	0.24	0.012	20.00
Nickel	47.1	160	0.29
TOTAL			67.71

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 590 ug/l; however, this value was not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-8
SITE 8 - NEDED EXPLOSIVES-CONTAMINATED WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	4.5	0.0198	227.27
RDX	64	0.8	80.00
Trichloroethene	15	2.5	6.00
TOTAL			313.27
NONCARCINOGENIC			
Aluminum	27,700	36,500	0.76
HMX	13	1,825	0.007
Lead	20.2	4	5.05
Manganese	547	182.5	3.00
Zinc	216	10,950	0.02
TOTAL			8.84

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1254	0.019	0.1	0.19
Arsenic	2.6	1	2.60
DDD	0.0022	3.5	0.001
DDE	0.0031	2.5	0.001
Dieldrin	0.0031	0.1	0.03
RDX	3.4	7.7	0.44
Trichloroethene	0.032	14.4	0.002
Vinyl Chloride	0.009	0.0097	0.93
TOTAL			4.19
NONCARCINOGENIC			
Copper	20.6	2,905.1	0.007
Dichloroethene,1,2-	0.09	281.8	0.0003
HMX	2.8	1,955.4	0.0007
Lead	62.7	500	0.13
Nickel	12.4	1,564.3	0.008
Vanadium	29.8	547.5	0.05
Zinc	165	23,464.3	0.007
TOTAL			0.20

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Lead	38.7	35	1.11
Mercury	2	0.15	13.33
Zinc	125	120	1.04
TOTAL			15.48

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	6.1	12	0.51
Lead	31.5	3.2	9.84
Nickel	21.3	160	0.13
TOTAL			10.48

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-9
SITE 9 -PLANT 1 EXPLOSIVES-CONTAMINATED WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	25.3	0.0198	1,277.39
Trinitrotoluene,2,4,6-	2,300	170.3	13.51
TOTAL			1,290.90
NONCARCINOGENIC			
Aluminum	85,300	36,500	2.34
Barium	2,070	2,555	0.81
Cadmium	5.8	18.3	0.32
Dinitrotoluene,2,4-	12	73	0.16
Lead	248	4	62.00
Manganese	9,130	182.5	50.03
Mercury	1.82	10.9	0.17
Nickel	164	730	0.23
Trinitrobenzene,1,3,5-	6.3	1.8	3.50
Zinc	3,940	10,950	0.36
TOTAL			119.92

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	19.7	1	19.70
Benzo(a)anthracene	0.55	1.2	0.46
Benzo(b)fluoranthene	0.62	1.2	0.52
Beryllium	0.86	0.4	2.15
Chromium	19.3	938.9	0.02
Chrysene	0.59	116.7	0.005
Trinitrotoluene,2,4,6-	2,100	1,703.3	1.23
TOTAL			24.09
NONCARCINOGENIC			
Copper	23.5	2,905.1	0.008
Dinitrotoluene,2,4-	3.2	78.2	0.04
Fluoranthene	1.1	1,564.3	0.001
Lead	64.7	500	0.13
Mercury	1.01	23.5	0.04
Nickel	8.6	1,564.3	0.005
Trinitrobenzene,1,3,5-	3	2	1.50
Vanadium	60.6	547.5	0.11
Zinc	175	23,464.3	0.007
TOTAL			1.84

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Acenaphthene	1.6	0.15	10.67
Anthracene	2.3	0.085	27.06
Arsenic	35.1	33	1.06
Benzo(a)anthracene	7.5	0.23	32.61
Benzo(a)pyrene	6	0.4	15.00
Copper	94.2	70	1.35
Chrysene	8.6	0.4	21.50
Dibenz(a,h)anthracene	1.5	0.06	25.00
Fluoranthene	10	0.6	16.67
Fluorene	1.9	0.035	54.29
Lead	266	35	7.60
Mercury	0.55	0.15	3.67
Phenanthrene	9.1	0.225	40.44
Pyrene	12	0.35	34.29
Zinc	442	120	3.68
TOTAL			294.89

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Dinitrotoluene,2,4-	0.38	230	0.002
Dinitrotoluene,2,6-	0.29	230	0.001
Lead	19.8	3.2	6.19
TOTAL			6.19

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-10
SITE 11 - ABANDONED EXPLOSIVES BURNING PITS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	90.3	0.048666	1,855.50
RDX	28	0.8	35.00
TOTAL			1,890.50
NONCARCINOGENIC			
Aluminum	14,500	36,500	0.40
Cadmium	10.3	18.3	0.56
HMX	4.2	1,825	0.002
Lead	20.7	4	5.18
Manganese	206	182.5	1.13
Zinc	134	10,950	0.01
TOTAL			7.28

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
NONCARCINOGENIC			
Barium	98.2	5,475	0.02
Copper	26.5	2,905.1	0.009
TOTAL			0.03

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Mercury	0.18	0.15	1.20
TOTAL			1.20

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	143	190	0.75
Chromium	71.6	210	0.34
Copper	258	12	21.50
Lead	300	3.2	93.75
Mercury	1.46	0.012	121.67
Nickel	61.9	160	0.39
TOTAL			238.40

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 904 ug/l; however, this value was not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-11
SITE 12 - BARRACKS ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Chloroform	2	0.3	6.67
RDX	4.4	0.8	5.50
Trichloroethene	55	2.5	22.00
Trinitrotoluene,2,4,6-	1.5	170.3	0.009
TOTAL			34.18
NONCARCINOGENIC			
Acetone	14	768.4	0.02
Aluminum	17,200	36,500	0.47
Antimony	46.3	14.6	3.17
Cadmium	7.4	18.3	0.40
Dichloroethene,1,2-	4	69.2	0.06
Lead	27.3	4	6.83
Manganese	3,300	182.5	18.08
Trinitrobenzene,1,3,5-	0.91	1.8	0.51
Zinc	160	10,950	0.02
TOTAL			29.56

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.2	1	28.20
Benzo(a)anthracene	1.4	1.2	1.17
Benzo(a)pyrene	1.2	0.1	12.00
Benzo(b)fluoranthene	1.9	1.2	1.58
Benzo(k)fluoranthene	1.5	1.2	1.25
Beryllium	1.8	0.4	4.50
Bis(2-ethylhexyl)phthalate	4.4	60.8	0.07
Chlordane, alpha-	0.084	0.7	0.12
Chlordane, gamma-	0.084	0.7	0.12
Chromium	44.9	928.9	0.05
Chrysene	1.5	116.7	0.01
DDD	0.35	3.5	0.10
DDE	3.6	2.5	1.44
DDT	5.7	2.5	2.28
Trinitrotoluene,2,4,6-	15	1,703.3	0.009
TOTAL			52.90
NONCARCINOGENIC			
Aluminum	17,400	78,214.3	0.22
Barium	1,180	5,475	0.22
Cadmium	30.6	39.1	0.78
Copper	720	2,905.1	0.25
Fluoranthene	4.1	1,564.3	0.003
Lead	1,200	500	2.40
Manganese	760	391.1	1.94
Mercury	2.87	23.5	0.12
Nickel	49.6	1564.3	0.03
Vanadium	93.1	547.5	0.17
Zinc	2,950	23,464.3	0.13
TOTAL			6.26

Notes: PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 12 Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Benzo(a)anthracene	0.14	0.23	0.61
Benzo(a)pyrene	0.11	0.4	0.28
Cadmium	8.2	5	1.64
Chlordane, alpha	0.116	0.0005	232.00
Chlordane, gamma	0.116	0.0005	232.00
Chrysene	0.12	0.4	0.30
DDD	0.18	0.002	90.00
DDE	0.052	0.002	26.00
DDT	0.22	0.001	220.00
Fluoranthene	0.3	0.6	0.50
Lead	59.4	35	1.70
Mercury	0.24	0.15	1.60
Phenanthrene	0.12	0.225	0.53
Pyrene	0.18	0.35	0.51
Silver	3	1	3.00
Zinc	286	120	2.38
TOTAL			813.05

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Cadmium	15.5	1.1	14.09
Copper	15.1	12	1.26
DDT	0.46	0.001	460.00
Lead	42	3.2	13.13
Mercury	0.24	0.012	20.00
Nickel	19	160	0.12
Trichloroethene	4	21,900	0.0002
TOTAL			508.60

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 100 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-12
SITE 16 - WEST ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	17.8	0.04866	365.76
Beryllium	7.8	0.0198	393.94
Dichlorobenzene,1,4-	4	0.7	5.71
Dichloroethene, 1,1-	1	0.1	10.00
RDX	1.3	0.8	1.63
TOTAL			777.04
NONCARCINOGENIC			
Aluminum	102,000	36,500	2.80
Antimony	48.3	14.6	3.31
Barium	362	2,555	0.14
Cadmium	5.7	18.3	0.31
Chlorobenzene	6	51.7	0.12
Dichloroethane,1,1-	3	1,006.9	0.003
Lead	56	4	14.00
Manganese	857	182.5	4.70
Mercury	0.25	10.9	0.02
Nickel	167	730	0.23
Phenol	1	21,900	0.00005
Trichloroethane,1,1,1-	3	1,506	0.002
Zinc	376	10,950	0.03
TOTAL			25.67

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1248	0.024	0.1	0.24
Aroclor 1254	0.88	0.1	8.80
Aroclor 1260	0.12	0.1	1.20
Arsenic	1.7	1	1.70
Beryllium	0.47	0.4	1.18
Bis(2-ethylhexyl)phthalate	0.59	60.8	0.01
Chromium	26.3	938.9	0.03
DDD	0.0023	3.5	0.001
DDE	0.0065	2.5	0.003
DDT	0.0019	2.5	0.001
Dieldrin	0.0077	0.1	0.08
TOTAL			13.25
NONCARCINOGENIC			
Aluminum	4,630	78,214.3	0.06
Barium	36.8	5,475	0.007
Cadmium	13.6	39.1	0.35
Lead	258	500	0.52
Manganese	470	391.1	1.20
Mercury	1.08	23.5	0.05
Nickel	18.3	1,564.3	0.01
Zinc	559	23,464.3	0.02
TOTAL			2.22

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Anthracene	0.021	0.085	0.25
Arsenic	6.5	33	0.20
Benzo(a)anthracene	0.074	0.23	0.32
Benzo(a)pyrene	0.05	0.4	0.13
Cadmium	1.8	5	0.36
Chromium	17.2	80	0.22
Chrysene	0.075	0.4	0.19
Copper	8.3	70	0.12
Fluoranthene	0.19	0.6	0.32
Lead	17.9	35	0.51
Nickel	28.6	30	0.95
Phenanthrene	0.077	0.225	0.34
Pyrene	0.081	0.35	0.23
Zinc	149	120	1.24
TOTAL			5.38

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Antimony	62.8	30	2.09
Arsenic	47.4	190	0.25
Beryllium	26.3	5.3	4.96
Cadmium	46.6	1.1	42.36
Chromium	517	210	2.46
Lead	293	3.2	91.56
Mercury	2.91	0.012	242.50
Nickel	775	160	4.84
Phenol	27	2,560	0.01
TOTAL			391.03

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Volatile compounds were detected at high concentrations (i.e., 1,1-DCE at 2 ug/l; 1,1-DCA at 5 ug/l; 1,1,1-TCA at 8 ug/l; and 4-methylphenol at 850 ug/l). There are no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Zinc was detected in the surface water at this site at a concentration of 4,890 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-13
SITE 17 - HOLM ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Soil
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	2.8	1.0	2.80
Benzo(a)anthracene	2.5	1.2	2.08
Benzo(a)pyrene	5	0.1	50.00
Benzo(b)fluoranthene	3	1.2	2.50
Benzo(k)fluoranthene	2.8	1.2	2.33
Chrysene	2.6	116.7	0.02
Dibenz(a,h)anthracene	0.97	0.1	9.70
Indeno(1,2,3-cd)pyrene	2.7	1.2	2.25
TOTAL			71.68
NONCARCINOGENIC			
Anthracene	3.6	1.9	1.89
Fluoranthene	1.8	1,564.3	0.001
Manganese	128	391.1	0.33
Mercury	0.08	23.5	0.003
Pyrene	3.9	1,173.2	0.003
Zinc	26.9	23,464.3	0.001
TOTAL			2.23

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Groundwater
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	106	0.048666	2,178.11
Beryllium	5.8	0.019806	292.84
TOTAL			2,470.95
NONCARCINOGENIC			
Aluminum	164,000	36,500	4.49
Lead	65.4	4	16.35
Manganese	405	182.5	2.22
Mercury	0.36	10.9	0.03
Nickel	351	730	0.48
Zinc	231	10,950	0.02
TOTAL			23.55

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

APPENDIX A-14
SITE 18 - BUILDING 476 DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 18 - Building 476 Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	7.5	0.019806	378.67
TOTAL			378.67
NONCARCINOGENIC			
Aluminum	144,000	36,500	3.95
Barium	505	2,555	0.20
Cadmium	12.6	18.3	0.69
Lead	260	4	65.00
Manganese	849	182.5	4.65
Mercury	0.73	10.9	0.07
Nickel	23.2	730	0.03
Zinc	357	10,950	0.03
TOTAL			74.62

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 18 - Building 476 Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	12.8	2.00	6.40
Arsenic	1.9	33	0.06
Chromium	18	80	0.23
Copper	29	70	0.41
Lead	8.3	35	0.24
Nickel	5.3	30	0.18
Zinc	44	120	0.37
TOTAL			7.89

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 18 - Building 476 Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	4.1	190	0.02
Copper	199	12	16.58
TOTAL			16.60

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 369 ug/L; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-15
SITE 19 - CONVEYOR BELT SOILS AT BUILDING 10
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 19 - Conveyor Belt Soils at Building 10
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Trinitrotoluene,2,4,6-	5.1	170.3	0.03
TOTAL			0.03
NONCARCINOGENIC			
Aluminum	4,510	36,500	0.12
Cadmium	4.5	18.3	0.25
Manganese	3,480	182.5	19.07
Trinitrobenzene,1,3,5-	1.3	1.8	0.72
TOTAL			20.16

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 19 - Conveyor Belt Soils at Building 10
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.3	1	28.30
Beryllium	2.6	0.4	6.50
Chromium	28.7	938.9	0.03
Dinitrotoluene,2,6-	0.77	1.3	0.59
Trinitrotoluene,2,4,6-	120	1703.3	0.07
TOTAL			35.49
NONCARCINOGENIC			
Copper	14.9	2,905.1	0.005
Dinitrotoluene,2,4-	1.3	78.2	0.02
Lead	49.9	500	0.10
Manganese	220	391.1	0.56
Nickel	20	1,564.3	0.01
Trinitrobenzene,1,3,5-	4.9	2	2.45
Vanadium	49.1	547.5	0.09
Zinc	69.1	23,464.3	0.003
TOTAL			3.24

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 19 - Conveyor Belt Soils at Building 10
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Anthracene	0.4	0.085	4.70
Benzo(a)anthracene	1.6	0.23	6.96
Benzo(a)pyrene	1.2	0.4	3.00
Chrysene	8.2	0.4	20.50
Dibenz(a,h)anthracene	0.46	0.06	7.67
Fluoranthene	27	0.6	45.00
Fluorene	0.23	0.035	6.57
Phenanthrene	26	0.225	115.56
Pyrene	13	0.35	37.14
Zinc	125	120	1.04
TOTAL			248.14

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

APPENDIX A-16
SITE 21 - BATTERY AND DRUM DISPOSAL AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 21 - Battery and Drum Disposal Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	5.8	0.048666	119.18
Beryllium	18.1	0.019806	913.86
TOTAL			1,032.36
NONCARCINOGENIC			
Aluminum	80,300	36,500	2.20
Barium	412	2,555	0.16
Cadmium	145	18.3	7.92
Lead	83	4	20.75
Manganese	7,870	182.5	43.12
Mercury	0.25	10.9	0.02
Nickel	117	730	0.16
Nitrates	25,100	58,400	0.43
Zinc	999,999	10,950	91.32
TOTAL			166.08

Notes:

PRG values based on ingestion of tap water.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

The actual zinc concentration in the groundwater was 2,490,000 ug/l; however, the Navy database fields are not large enough to accommodate a number above 999,999.00.

Quantitative Site Ranking - Soil
Site 21 - Battery and Drum Disposal Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.3	1	28.30
Beryllium	0.57	0.4	1.43
Benzo(b)fluoranthene	0.99	1.2	0.83
Benzo(k)fluoranthene	0.54	1.2	0.45
Bis(2-ethylhexyl)phthalate	2.1	60.8	0.04
Chromium	28.4	938.9	0.03
Chrysene	0.52	116.7	0.004
Pentachlorophenol	0.29	7.1	0.04
TOTAL			31.12
NONCARCINOGENIC			
Aluminum	13,700	78,214.3	0.18
Barium	72.8	5,475	0.01
Cadmium	8.6	39.1	0.22
Lead	113	500	0.23
Manganese	1,380	391.1	3.52
Mercury	0.76	23.5	0.03
Nickel	9.2	1,564	0.006
Pyrene	0.98	1,173	0.001
Styrene	0.02	13,000	0.000002
Trichloroethane,1,1,1-	0.014	300	0.00004
Toluene	0.035	280	0.0001
Xylene	0.004	99	0.00004
Zinc	2,160	23,464.3	0.09
TOTAL			4.29

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

APPENDIX B
DETAILED SCHEDULES FOR REMOVAL ACTIONS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure B - 1

FY 94/95: Removal Action at Sites 4, 16, and 21
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITES 4, 16, and 21	631ed	2/15/93	11/8/94
EE/CA Report	**393ed**	**2/15/93**	**3/15/94**
Public Comment Period	31ed	10/21/94	11/21/94
Final	113ed	11/22/93	3/15/94
REMOVAL ACTION MEMORANDUM	**105ed**	**11/30/93**	**3/15/94**
Draft	30ed	11/30/93	12/30/93
Review (Navy/EPA/State)	32ed	12/30/93	1/31/94
Final	43ed	1/31/94	3/15/94
REMOVAL ACTION WORK PLAN (Revised)	**190ed**	**9/30/93**	**4/8/94**
Draft	131ed	9/30/93	2/8/94
Review (Navy/EPA/State)	28ed	2/8/94	3/8/94
Final	31ed	3/8/94	4/8/94
REMOVAL ACTION	**214ed**	**4/1/94**	**11/1/94**

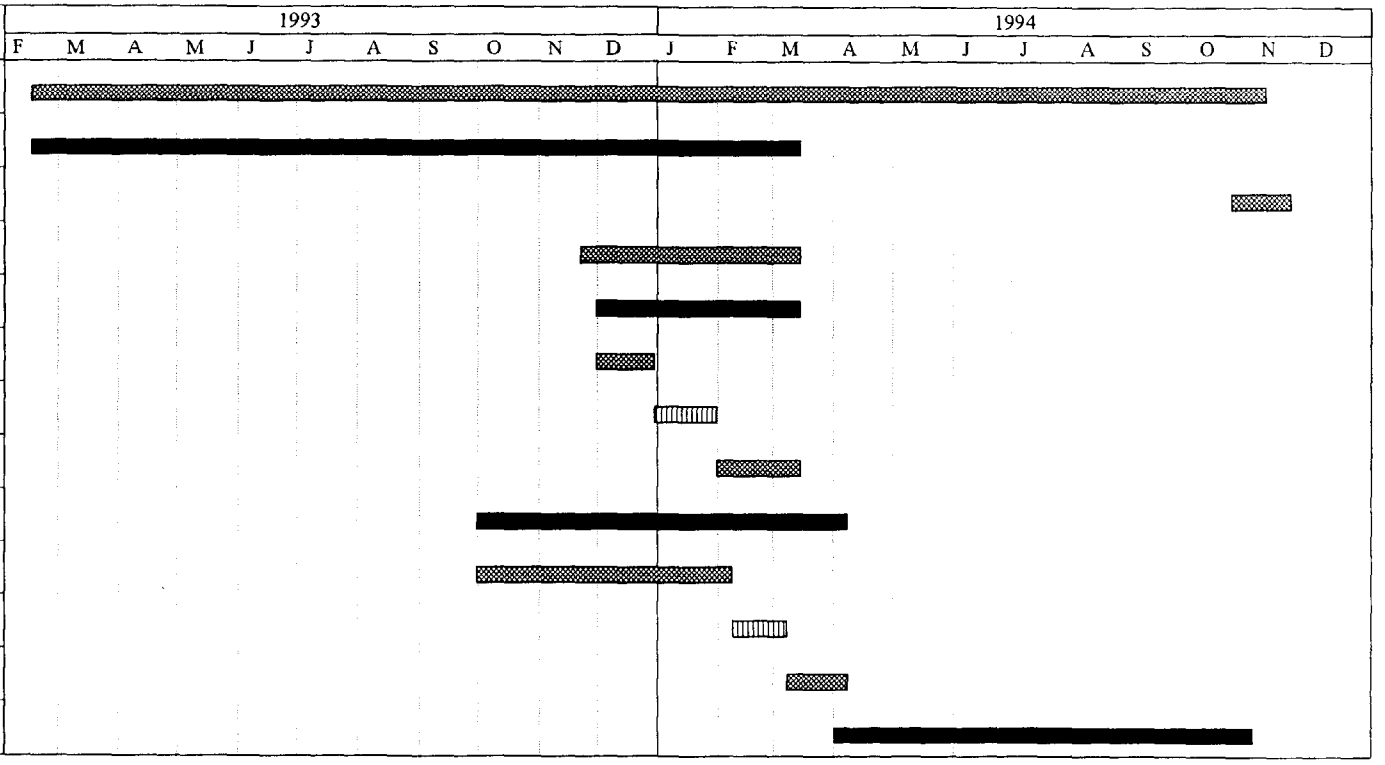


Figure B - 2

FY 94/95: Removal Action at Sites 2, 9 and SSA 4
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITES 2, 9 and SSA 4	612ed	4/12/93	12/15/94
EE/CA Report	**309ed**	**4/12/93**	**2/15/94**
Draft Final	23ed	11/22/93	12/15/93
PUBLIC COMMENT PERIOD	31ed	12/19/93	1/19/94
Final	22ed	1/24/94	2/15/94
REMOVAL ACTION MEMORANDUM	**74ed**	**4/4/94**	**6/17/94**
Draft	30ed	4/4/94	5/4/94
Review (Navy/EPA/State)	30ed	5/4/94	6/3/94
Final	14ed	6/3/94	6/17/94
REMOVAL ACTION WORK PLAN	**90ed**	**6/3/94**	**9/1/94**
Draft	30ed	6/3/94	7/3/94
Review (Navy/EPA/State)	30ed	7/3/94	8/2/94
Final	30ed	8/2/94	9/1/94
REMOVAL ACTION	**172ed**	**9/1/94**	**2/20/95**

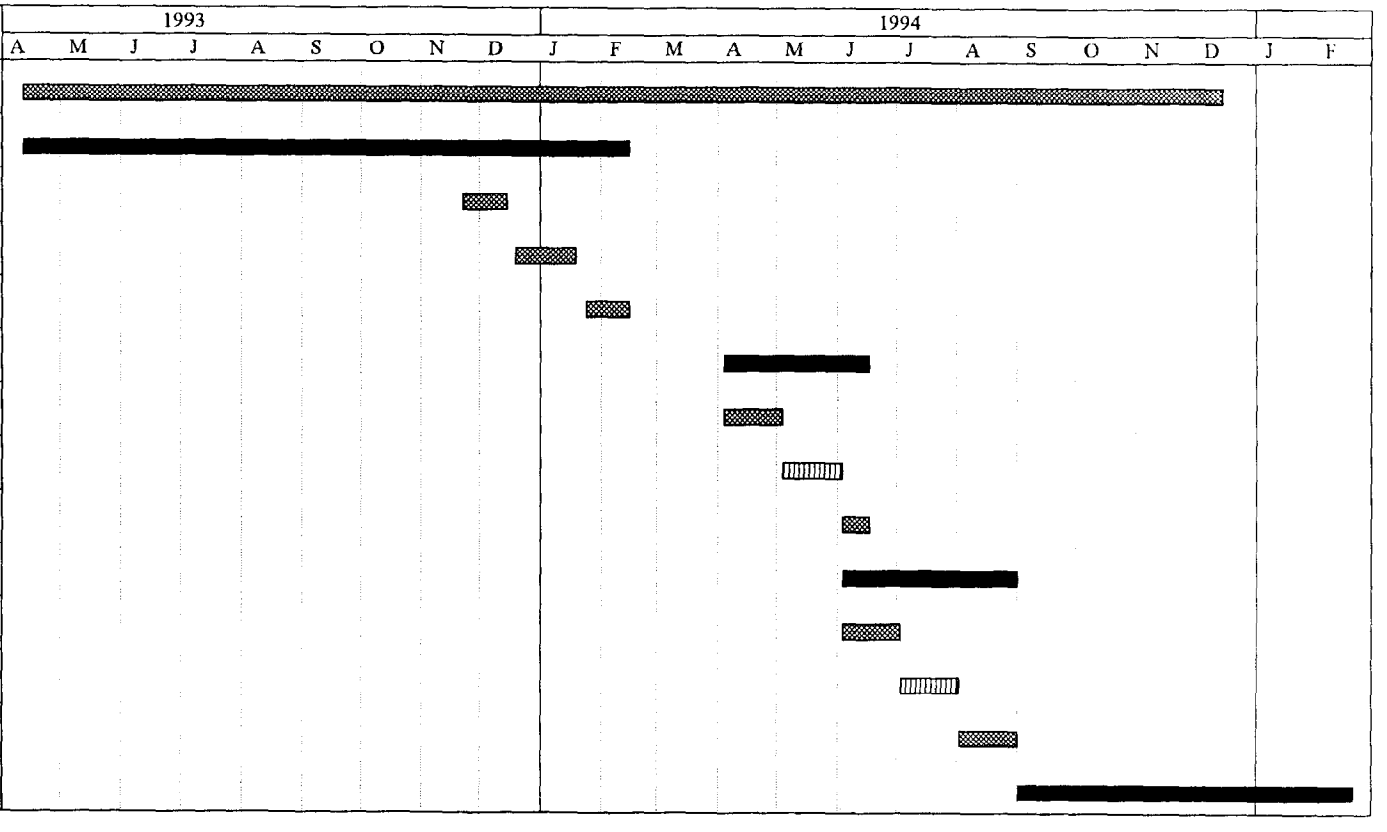


Figure B - 3

FY 94/95: Removal Action at Site Screening Areas 1, 2 and 5
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 1, 2, and 5	610ed	9/1/93	5/4/95
EE/CA REPORT (Includes Sampling/Analysis)	**288ed**	**9/1/93**	**6/16/94**
Preliminary Draft	93ed	9/1/93	12/3/93
Review (Navy)	24ed	12/3/93	12/27/93
Draft	48ed	12/27/93	2/13/94
Review (EPA/State)	30ed	2/13/94	3/15/94
PUBLIC COMMENT PERIOD	**30ed**	**2/13/94**	**3/15/94**
Final	93ed	3/15/94	6/16/94
REMOVAL ACTION MEMORANDUM	**93ed**	**3/15/94**	**6/16/94**
Draft	34ed	3/15/94	4/18/94
Review (Navy/EPA/State)	28ed	4/18/94	5/16/94
Final	31ed	5/16/94	6/16/94
REMOVAL ACTION DESIGN	**126ed**	**10/11/93**	**2/14/94**
90% Design	53ed	10/11/93	12/3/93
Review (Navy)	34ed	12/3/93	1/6/94
Final Design	39ed	1/6/94	2/14/94
REMOVAL ACTION WORK PLAN	**68ed**	**5/4/94**	**7/11/94**
Draft	33ed	5/4/94	6/6/94
Review (Navy)	14ed	6/6/94	6/20/94
Final	21ed	6/20/94	7/11/94
REMOVAL ACTION	**117ed**	**7/11/94**	**11/5/94**

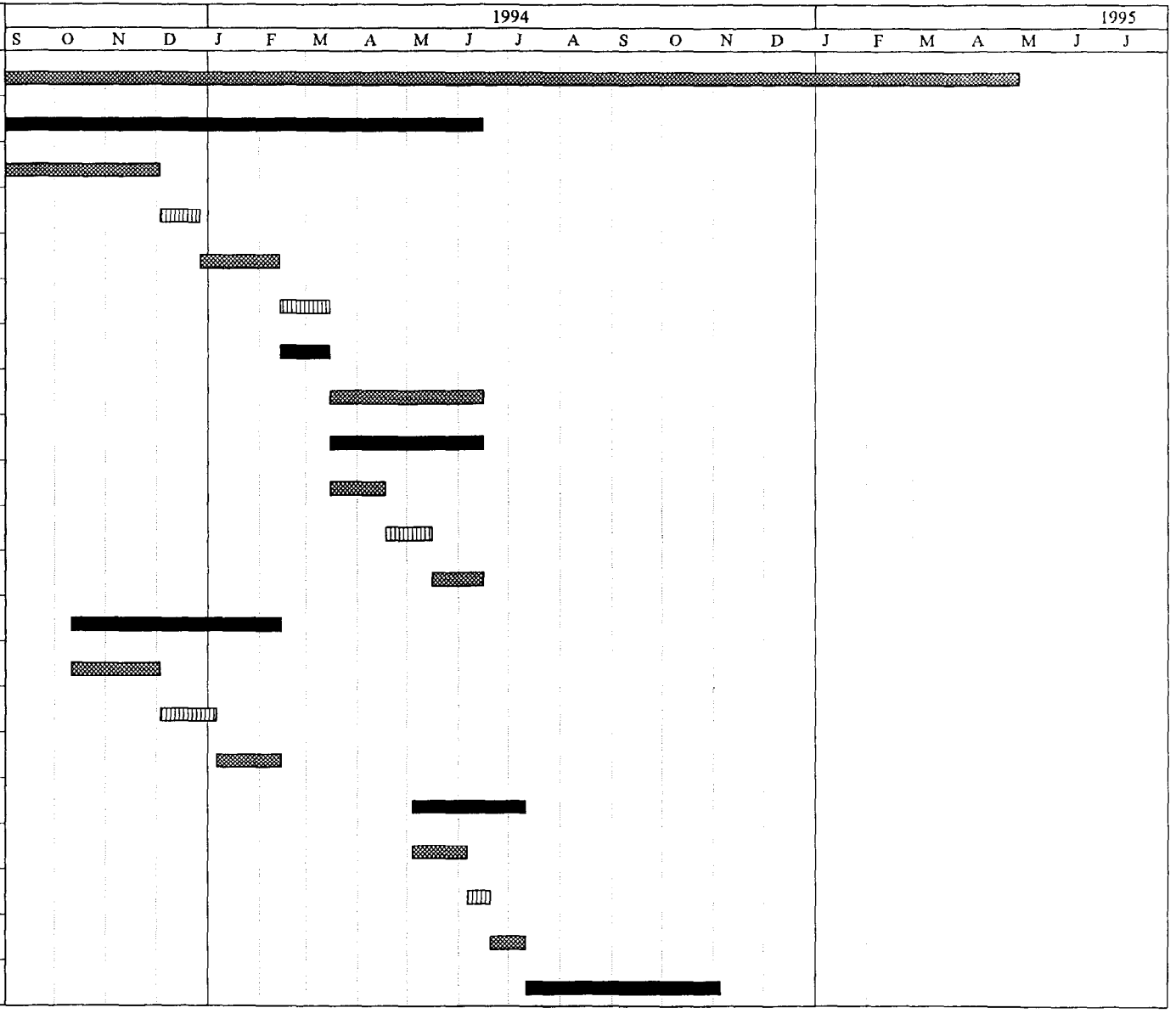
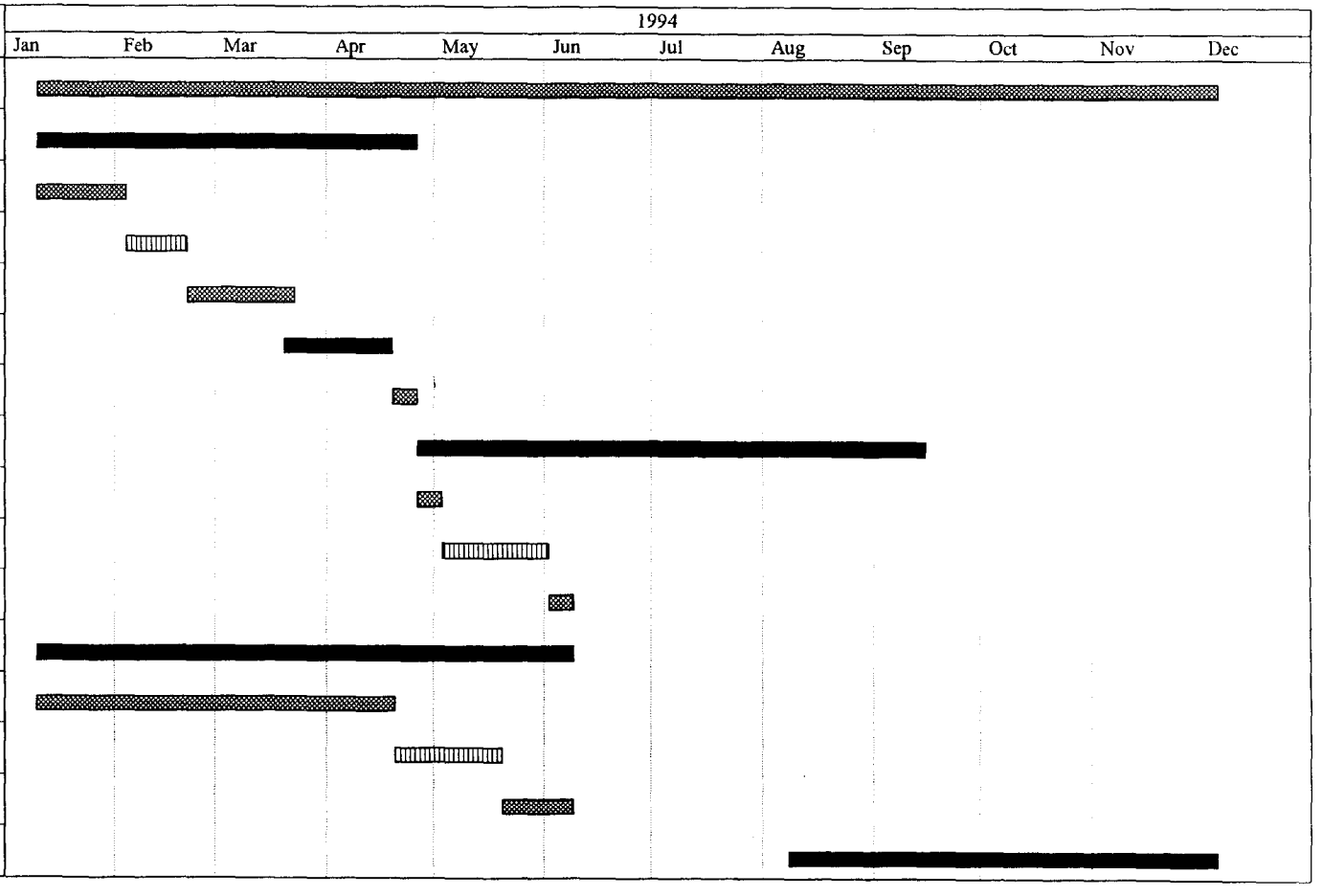


Figure B - 5

FY 94/95: Removal Action at Site Screening Area 17
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREA 17	330ed	1/10/94	12/6/94
EE/CA REPORT	**106ed**	**1/10/94**	**4/26/94**
Preliminary Draft	25ed	1/10/94	2/4/94
Review (Navy)	17ed	2/4/94	2/21/94
Draft	30ed	2/21/94	3/23/94
PUBLIC COMMENT PERIOD	**30ed**	**3/20/94**	**4/19/94**
Final	7ed	4/19/94	4/26/94
REMOVAL ACTION MEMORANDUM	**142ed**	**4/26/94**	**9/15/94**
Draft	7ed	4/26/94	5/3/94
Review (Navy/EPA/State)	30ed	5/3/94	6/2/94
Final	7ed	6/2/94	6/9/94
REMOVAL ACTION DESIGN	**150ed**	**1/10/94**	**6/9/94**
90% Design	100ed	1/10/94	4/20/94
Review (Navy)	30ed	4/20/94	5/20/94
Final Design	20ed	5/20/94	6/9/94
REMOVAL ACTION	**120ed**	**8/8/94**	**12/6/94**



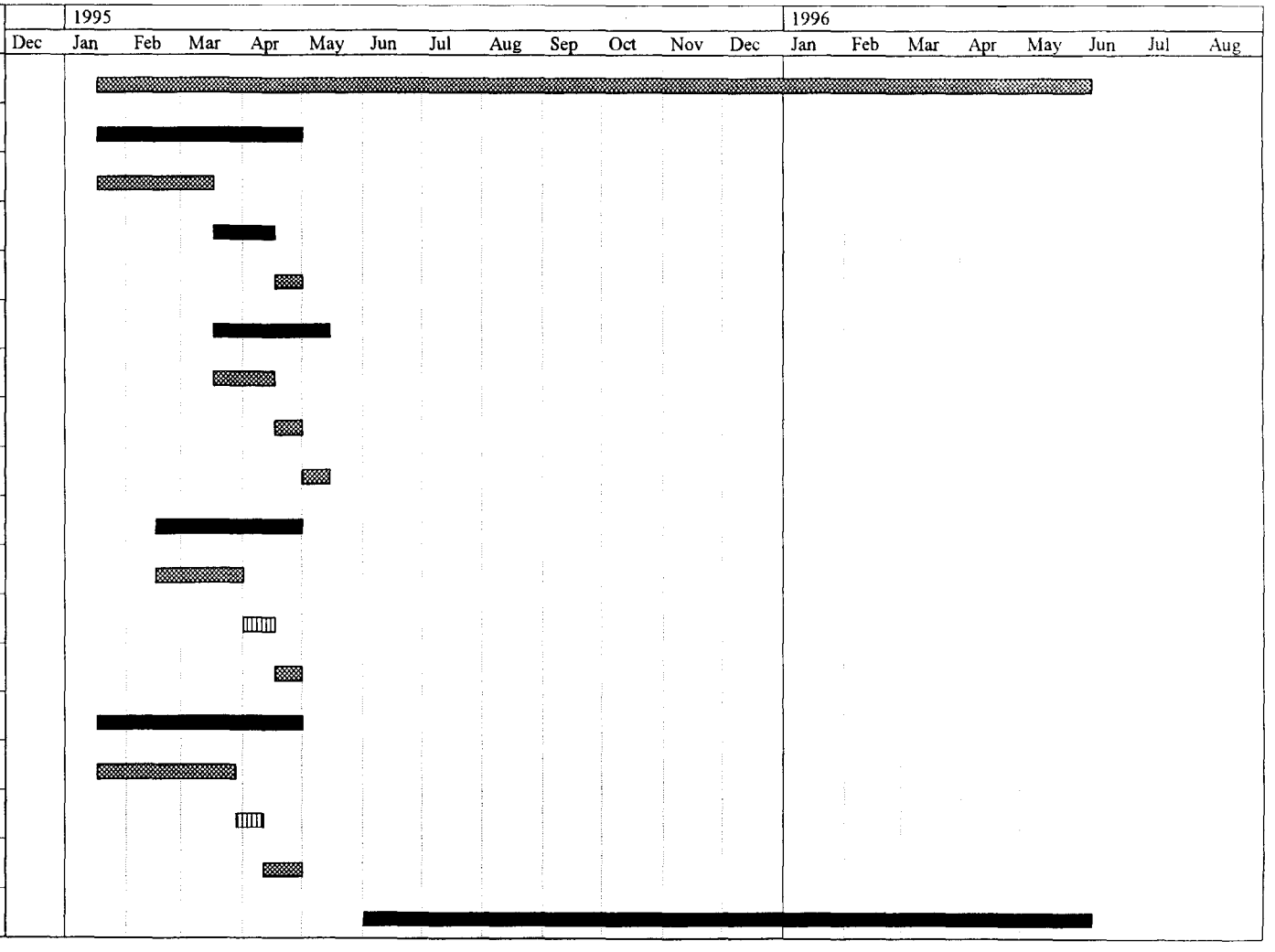
Note: Some delays have been encountered at SSA 17. This schedule will be updated to reflect these delays in the FY 96/97 SMP.

Figure 3 - 6

FY 95/96: Removal Action at Site Screening Areas 3 and 7

Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 3 and 7	507d	1/17/95	6/6/96
EE/CA REPORT	**105d**	**1/17/95**	**5/1/95**
Draft	60d	1/17/95	3/17/95
PUBLIC COMMENT PERIOD	**32d**	**3/17/95**	**4/17/95**
Final	15d	4/17/95	5/1/95
TANK CLOSURE PLAN	**60d**	**3/17/95**	**5/15/95**
Draft	32d	3/17/95	4/17/95
Review (EPA/State/Navy)	15d	4/17/95	5/1/95
Final	15d	5/1/95	5/15/95
REMOVAL ACTION MEMORANDUM	**75d**	**2/16/95**	**5/1/95**
Draft	45d	2/16/95	4/1/95
Review (Navy/EPA/State)	17d	4/1/95	4/17/95
Final	14ed	4/17/95	5/1/95
REMOVAL ACTION DESIGN	**105d**	**1/17/95**	**5/1/95**
90% Design	71d	1/17/95	3/28/95
Review (Navy/EPA/State)	14ed	3/28/95	4/11/95
Final Design	21d	4/11/95	5/1/95
REMOVAL ACTION	**372d**	**6/1/95**	**6/6/96**



Note: The Preliminary Draft EE/CA will be replaced by a meeting prior to submitting the Draft EE/CA.

APPENDIX C
DETAILED SCHEDULES FOR INVESTIGATIVE WORK: FY 1994AND 1995 NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure C - 1

FY 94/95: Site 5 Risk Assessment, Proposed Plan, and Record of Decision
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start
Site 5	391ed	9/1/93
RISK ASSESSMENT	**272ed**	**9/1/93**
Preliminary Draft	61ed	9/1/93
Review (Navy)	29ed	11/1/93
Draft	30ed	11/30/93
Review (EPA/State)	60ed	12/30/93
Draft Final	60ed	2/28/94
Final	32ed	4/29/94
PROPOSED PLAN	**212ed**	**11/1/93**
Preliminary Draft	30ed	11/1/93
Review (Navy)	33ed	12/1/93
Draft	28ed	1/3/94
Review (EPA/State)	60ed	1/31/94
Draft Final	31ed	4/1/94
Final	30ed	5/2/94
PUBLIC COMMENT PERIOD	**45ed**	**6/5/94**
RECORD OF DECISION	**300ed**	**12/1/93**
Preliminary Draft	33ed	12/1/93
Review (Navy)	29ed	1/3/94
Draft	29ed	2/1/94
Review (EPA/State)	61ed	3/2/94
Draft Final	30ed	5/2/94

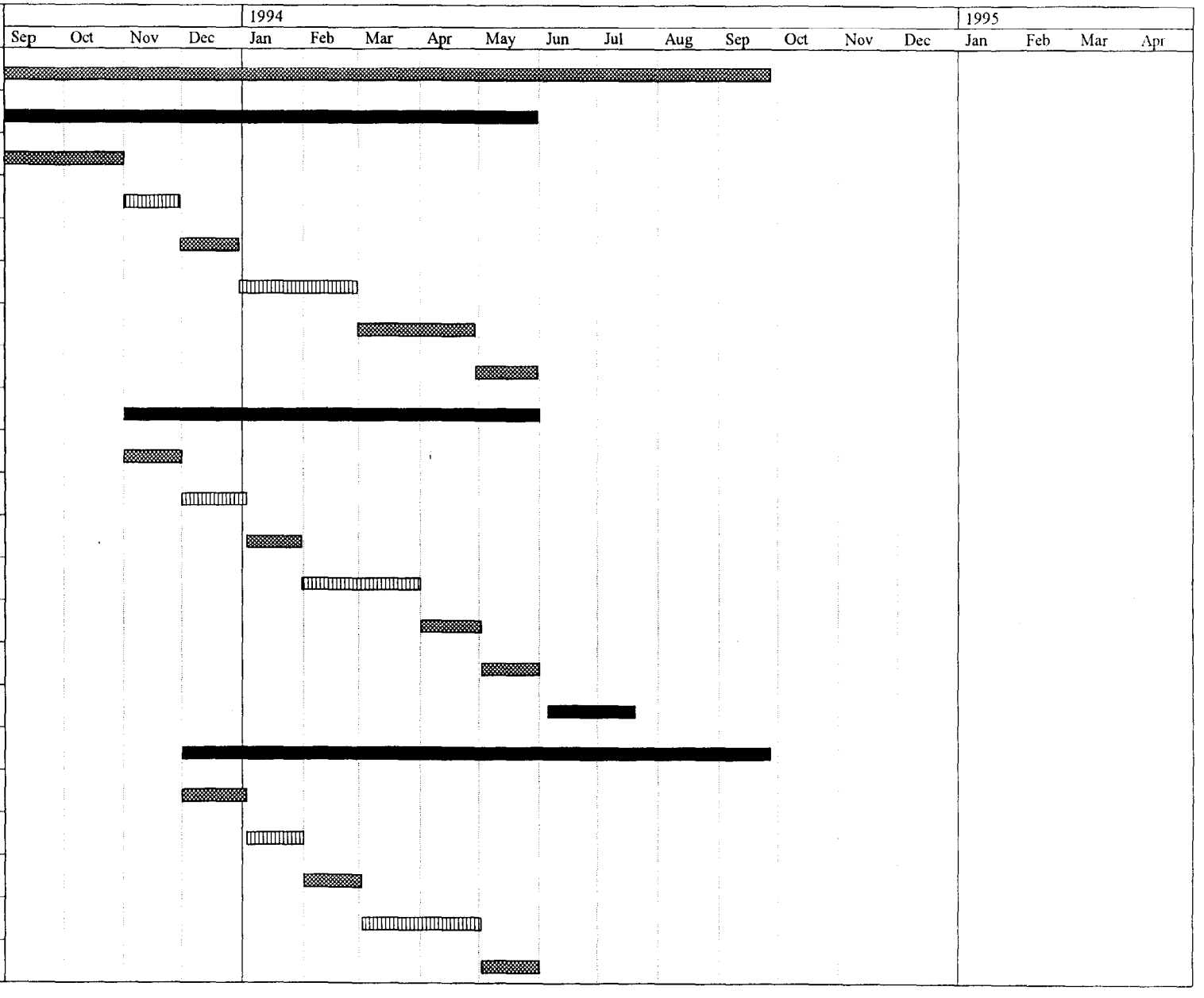


Figure C - 1

FY 94/95: Site 5 Risk Assessment, Proposed Plan, and Record of Decision
Naval Weapons Station Yorktown, Yorktown, Virginia

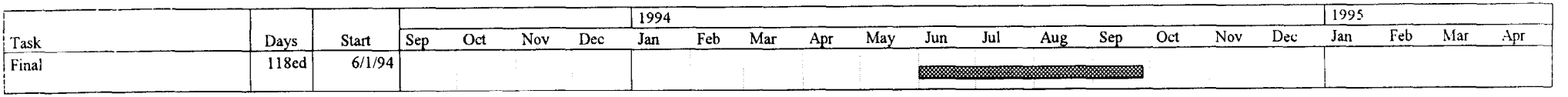


Figure C - 2

FY 94/95: Sites 6, 7, 12, 16, SSA 16 and Background Work Plan / Field Investigation
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 6, 7, 12, 16, SSA 16 and Background	474ed	9/1/93	12/19/94
RI WORK PLAN	**278ed**	**9/1/93**	**6/6/94**
Preliminary Draft	61ed	9/1/93	11/1/93
Review (Navy)	30ed	11/1/93	12/1/93
Draft	34ed	12/1/93	1/4/94
Review (EPA/State)	60ed	1/4/94	3/5/94
Draft Final	60ed	3/5/94	5/4/94
Final	31ed	5/4/94	6/4/94
RI FIELD INVESTIGATION	**135ed**	**6/20/94**	**11/2/94**
Mobilization	15ed	6/20/94	7/5/94
Field Investigation	120ed	7/5/94	11/2/94
SAMPLE ANALYSIS/VALIDATION	**160ed**	**7/7/94**	**12/14/94**
Sample Analysis	146ed	7/7/94	11/30/94
Data Validation	132ed	8/4/94	12/14/94

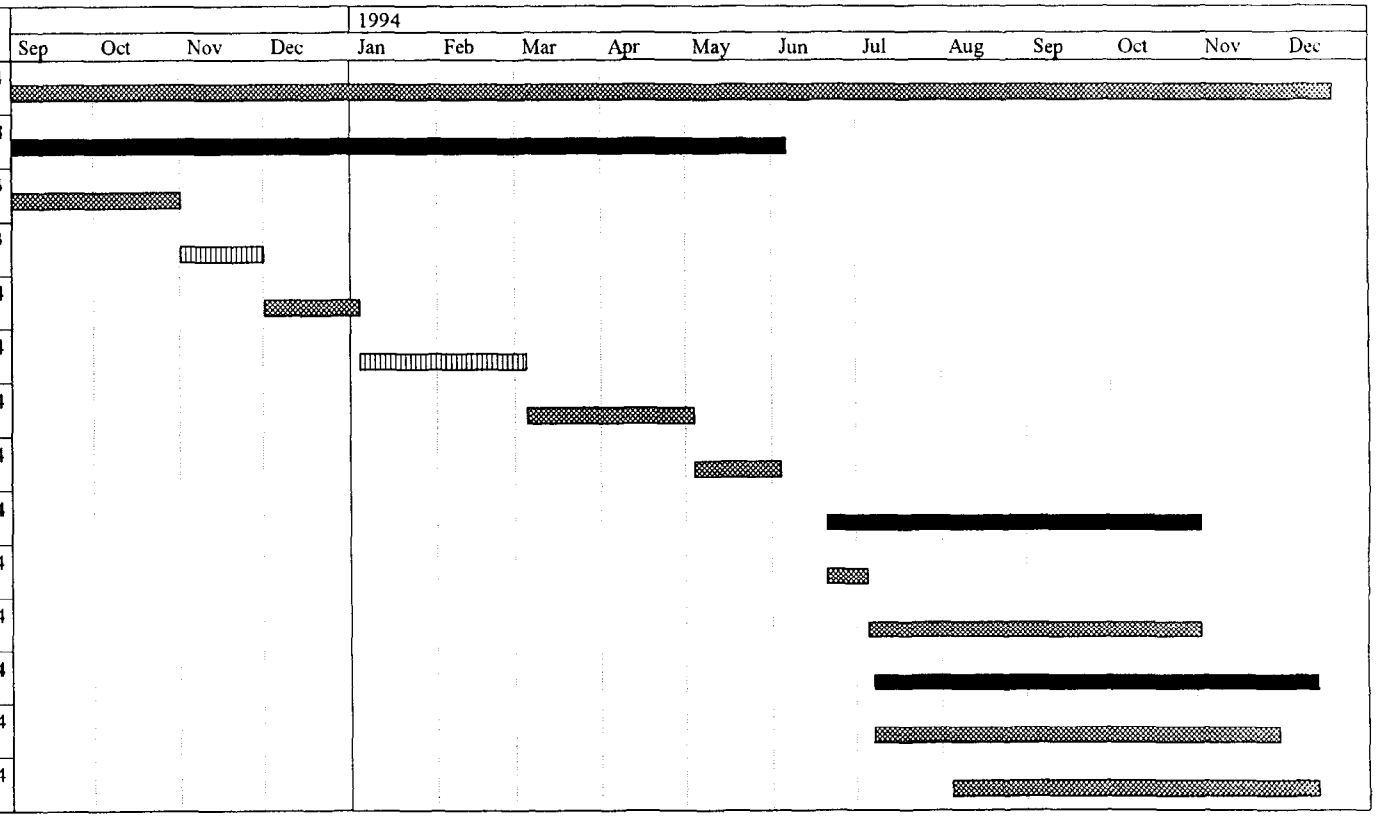


Figure C - 3

FY 94/95: York River Basin Background Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
YORK RIVER BASIN BACKGROUND REPORT	**300ed**	**12/1/94**	**9/27/95**
Preliminary Draft	90ed	12/1/94	3/1/95
Review (Navy)	30ed	3/1/95	3/31/95
Draft	31ed	3/31/95	5/1/95
Review (EPA/State)	59ed	5/1/95	6/29/95
Draft Final	60ed	6/29/95	8/28/95
Review (EPA/State)	29ed	7/31/95	8/29/95
Final	30ed	8/29/95	9/28/95

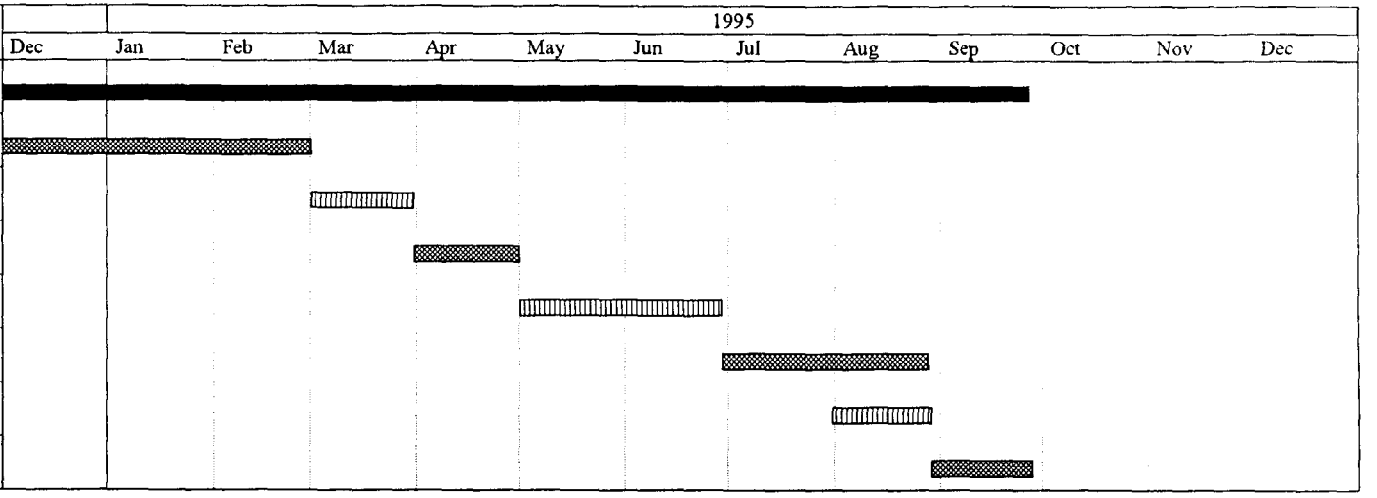
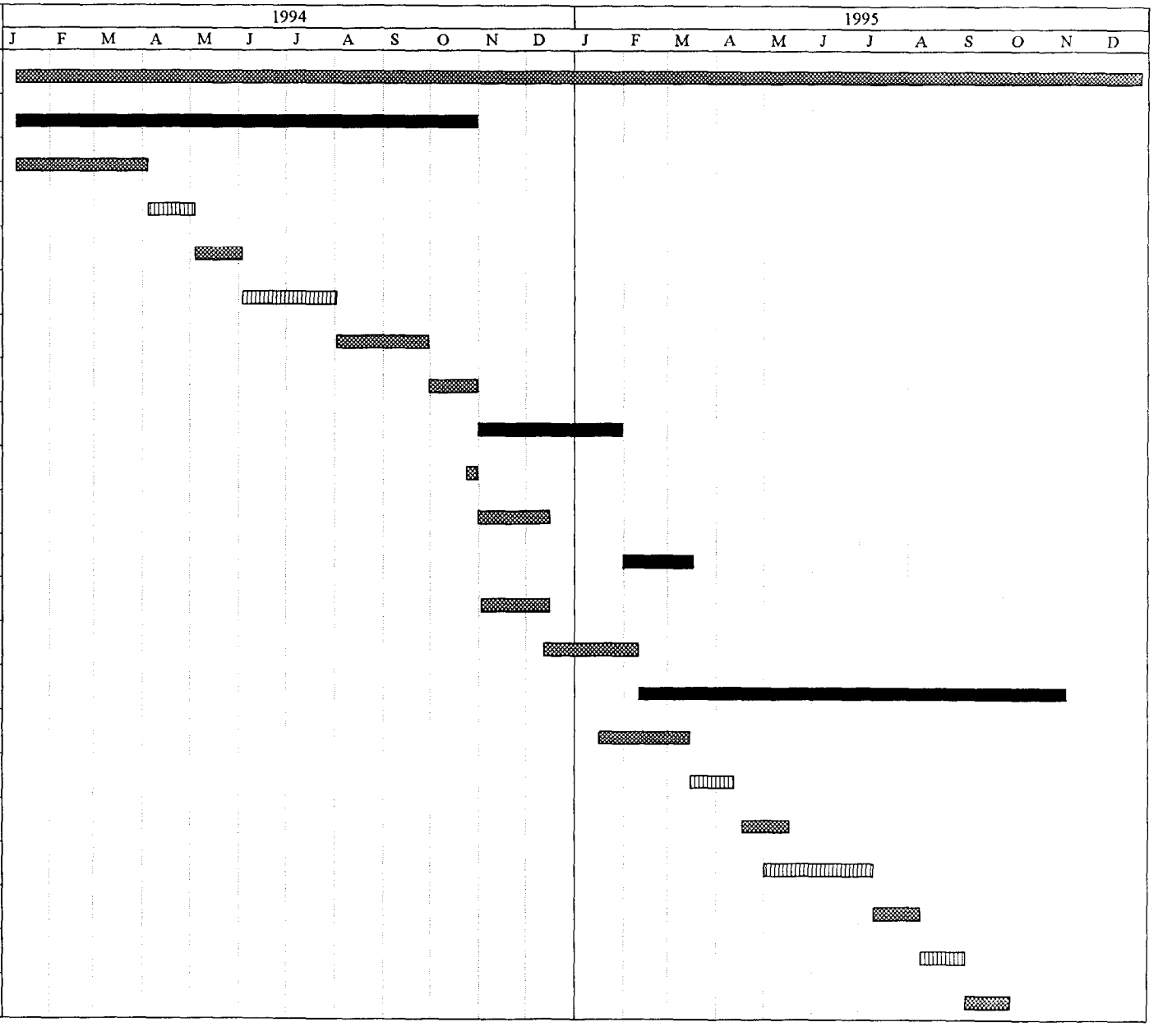


Figure C - 4

FY 94/95: Site Screening Areas 1, 6, 7, and 15 Work Plan, Field Investigation and Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 1, 6, 7, and 15	717ed	1/10/94	12/28/95
SSA WORK PLAN	**294ed**	**1/10/94**	**10/31/94**
Preliminary Draft	84ed	1/10/94	4/4/94
Review (Navy)	30ed	4/4/94	5/4/94
Draft	30ed	5/4/94	6/3/94
Review (EPA/State)	60ed	6/3/94	8/2/94
Draft Final	59ed	8/2/94	9/30/94
Final	31ed	9/30/94	10/31/94
SSA FIELD INVESTIGATION	**92ed**	**10/31/94**	**1/31/95**
Mobilization	7ed	10/24/94	10/31/94
Field Investigation	46ed	10/31/94	12/16/94
SAMPLE ANALYSIS/VALIDATION	**45ed**	**1/31/95**	**3/17/95**
Sample Analysis	44ed	11/2/94	12/16/94
Data Validation	60ed	12/12/94	2/10/95
SSA REPORT	**273ed**	**2/10/95**	**11/10/95**
Preliminary Draft	58ed	1/16/95	3/15/95
Review (Navy)	28ed	3/15/95	4/12/95
Draft	30ed	4/17/95	5/17/95
Review (EPA/State)	70ed	5/1/95	7/10/95
Draft Final	30ed	7/10/95	8/9/95
Review (EPA/State)	29ed	8/9/95	9/7/95
Final	29ed	9/7/95	10/6/95



APPENDIX D
DETAILED SCHEDULES: FY 1995 AND 1996
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure D - 1

FY 95/96: Site Screening Areas 2, 17, 18 and 19 Work Plan, Field Investigation and Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 2, 17, 18 and 19	501ed	8/15/94	12/29/95
SSP WORK PLAN	**153ed**	**8/15/94**	**1/15/95**
Draft	31ed	8/15/94	9/15/94
Review (Navy)	61ed	9/15/94	11/15/94
Draft Final	30ed	11/15/94	12/15/94
Review (EPA/State)	31ed	12/15/94	1/15/95
Final	26ed	1/15/95	2/10/95
SSP FIELD INVESTIGATION	**59ed**	**1/15/95**	**3/15/95**
Mobilization	1ed	2/6/95	2/7/95
Field Investigation	12ed	2/8/95	2/20/95
SAMPLE ANALYSIS/VALIDATION	**70ed**	**2/1/95**	**4/12/95**
Sample Analysis	54ed	2/8/95	4/3/95
Data Validation	28ed	3/20/95	4/17/95
SSP REPORT	**245ed**	**4/17/95**	**12/18/95**
Preliminary Draft	43ed	4/17/95	5/30/95
Review (Navy)	29ed	5/31/95	6/29/95
Draft	31ed	6/30/95	7/31/95
Review (EPA/State)	59ed	8/1/95	9/29/95
Draft Final	31ed	9/29/95	10/30/95
Review (EPA/State)	30ed	10/30/95	11/29/95
Final	29ed	11/30/95	12/29/95

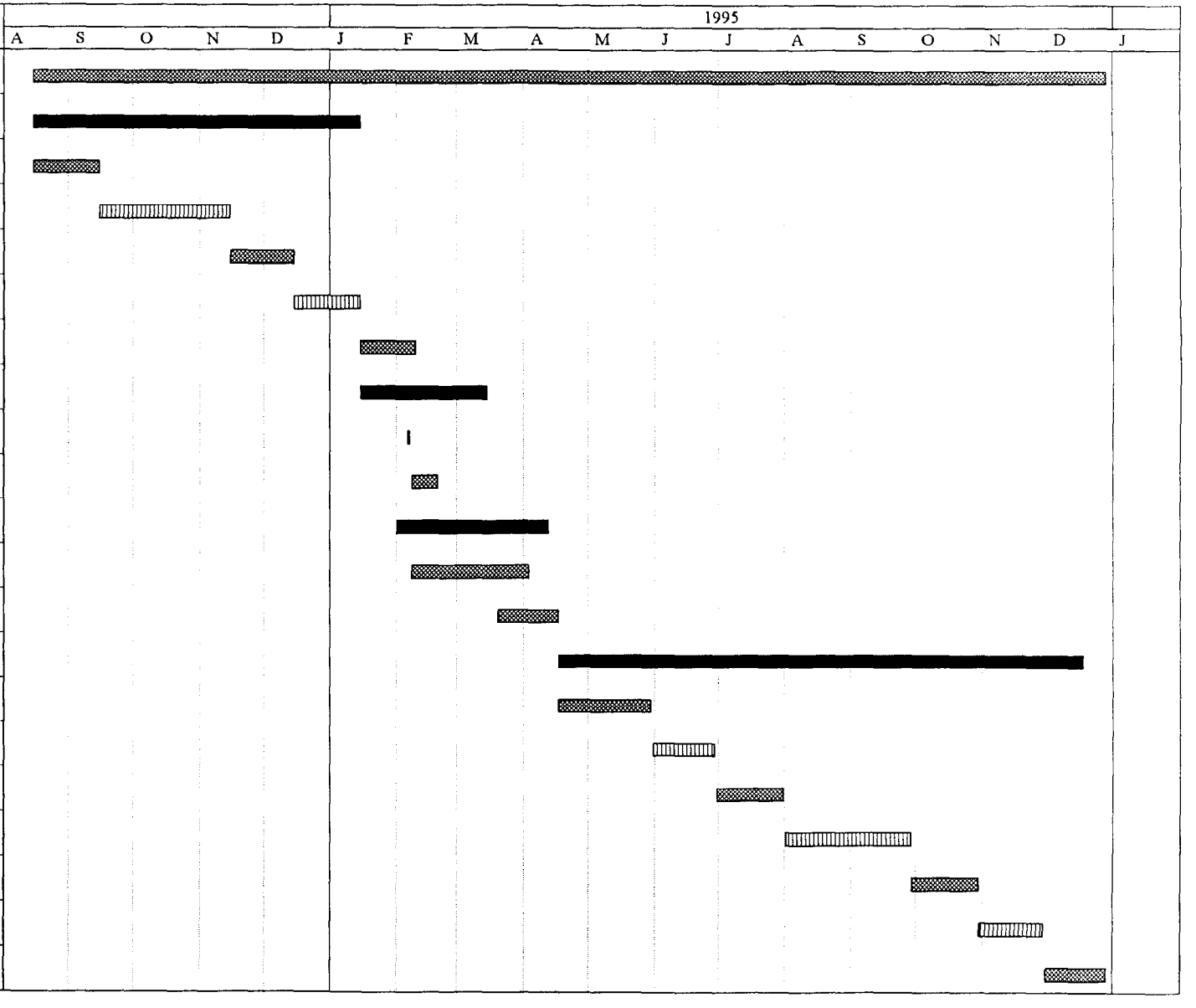


Figure D - 2

FY 95/96: Site 16 and SSA 16 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Remedial Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Site 16 and SSA 16	781ed	12/23/94	2/11/97
REMEDIAL INVESTIGATION REORT	**271ed**	**12/23/94**	**9/20/95**
Preliminary Draft	62ed	12/23/94	2/23/95
Review (Navy)	27ed	2/24/95	3/23/95
Draft	28ed	3/24/95	4/21/95
Review (EPA/State)	58ed	4/24/95	6/21/95
Draft Final	29ed	6/22/95	7/21/95
Review (EPA/State)	28ed	7/24/95	8/21/95
Final	29ed	8/22/95	9/20/95
FEASIBILITY STUDY	**270ed**	**1/23/95**	**10/20/95**
Preliminary Draft	58ed	1/23/95	3/22/95
Review (Navy)	29ed	3/23/95	4/21/95
Draft	28ed	4/24/95	5/22/95
Review (EPA/State)	59ed	5/23/95	7/21/95
Draft Final	28ed	7/24/95	8/21/95
Review (EPA/State)	29ed	8/22/95	9/20/95
Final	29ed	9/21/95	10/20/95
PROPOSED PLAN	**270ed**	**1/23/95**	**10/20/95**
Preliminary Draft	58ed	1/23/95	3/22/95
Review (Navy)	29ed	3/23/95	4/21/95
Draft	28ed	4/24/95	5/22/95
Review (EPA/State)	59ed	5/23/95	7/21/95

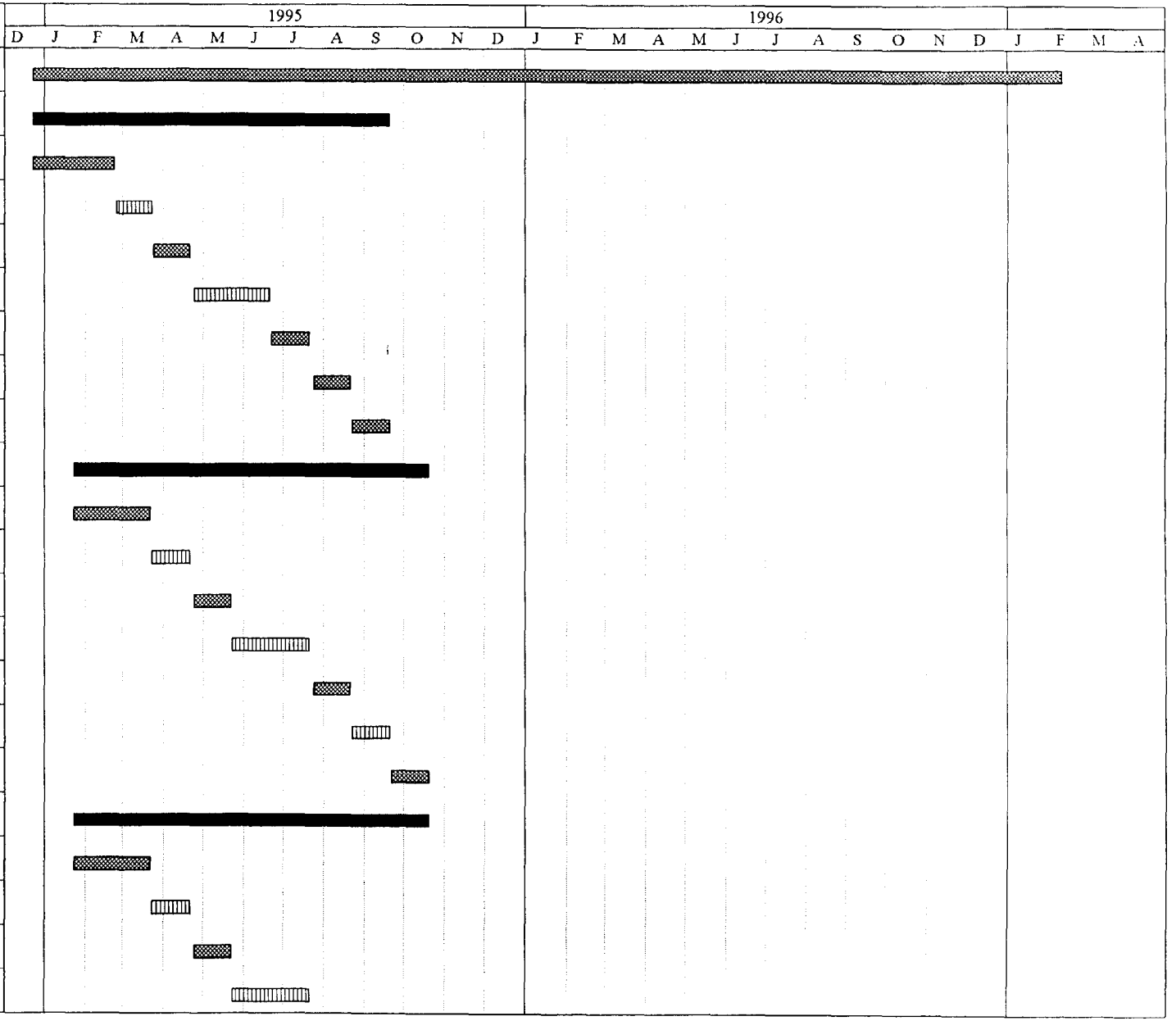


Figure D - 2

FY 95/96: Site 16 and SSA 16 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Remedial Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Draft Final	29ed	7/24/95	8/22/95
Review (EPA/State)	29ed	8/22/95	9/20/95
Final	29ed	9/21/95	10/20/95
PUBLIC COMMENT PERIOD	**46ed**	**9/21/95**	**11/6/95**
RECORD OF DECISION	**242ed**	**3/23/95**	**11/20/95**
Preliminary Draft	29ed	3/23/95	4/21/95
Review (Navy)	28ed	4/21/95	5/19/95
Draft	32ed	5/19/95	6/20/95
Review (EPA/State)	58ed	6/21/95	8/18/95
Draft Final	32ed	8/18/95	9/19/95
Review (EPA/State)	30ed	9/19/95	10/19/95
Final	32ed	10/19/95	11/20/95
REMEDIAL DESIGN	**448ed**	**11/20/95**	**2/10/97**
Draft Remedial Design/Work Plans	102ed	11/20/95	3/1/96
Review (Navy/EPA/State)	61ed	3/1/96	5/1/96
Prefinal Remedial Design/Work Plans	58ed	5/1/96	6/28/96
Review (Navy/EPA/State)	60ed	6/28/96	8/27/96
Final Remedial Design/Work Plans	59ed	8/27/96	10/25/96
Review/Concurrance (EPA/State)	17ed	10/25/96	11/11/96
Construction Contracting	91ed	11/11/96	2/10/97
REMEDIAL ACTION	**1ed**	**2/10/97**	**2/11/97**

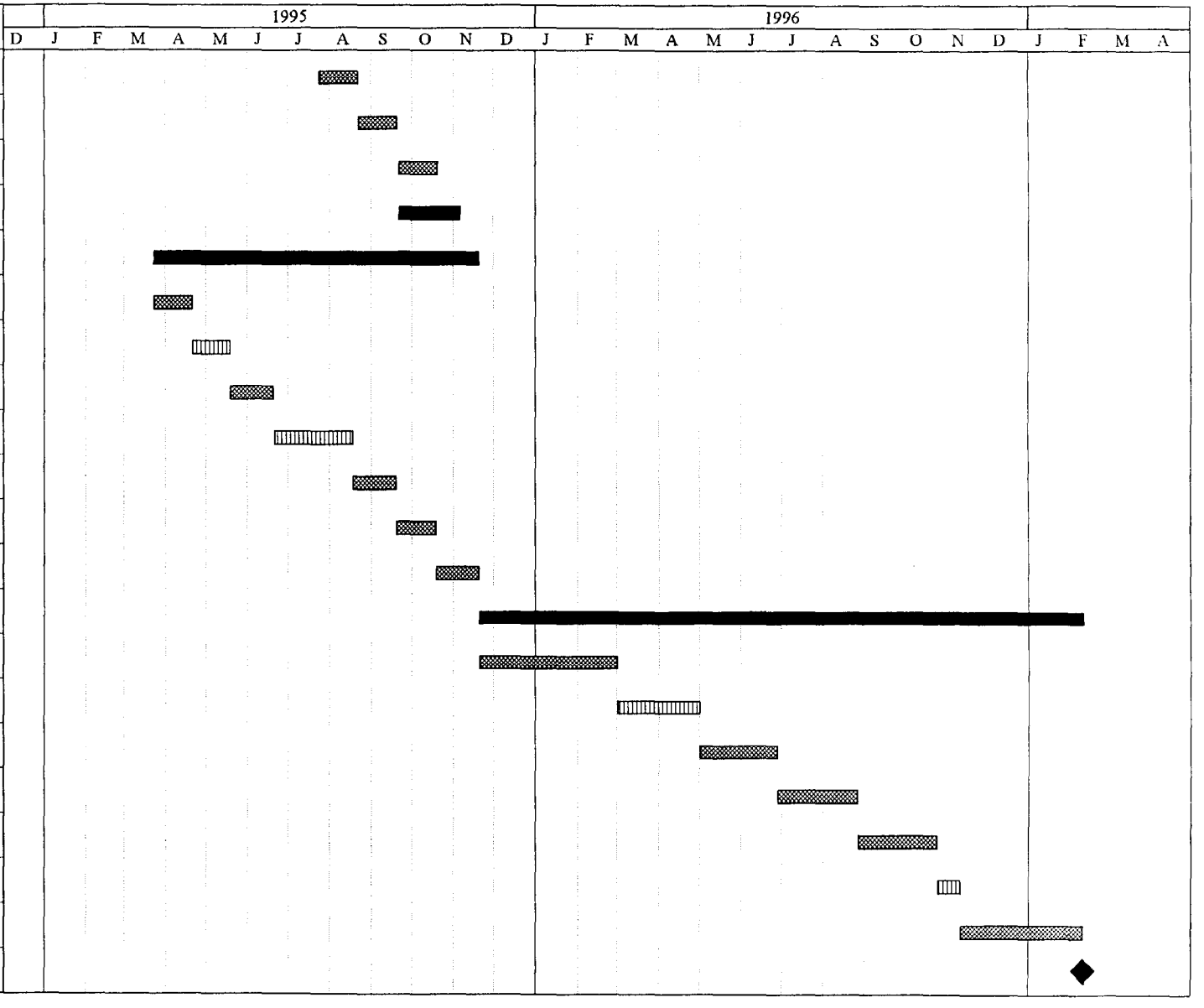


Figure D - 3

FY 95/96: Sites 9 and 19 Work Plan/Field Investigation
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 9 and 19	389ed	12/1/94	12/25/95
RI WORK PLAN	**242ed**	**12/1/94**	**7/31/95**
Preliminary Draft	60ed	12/1/94	1/30/95
Review (Navy)	30ed	1/30/95	3/1/95
Draft	30ed	3/1/95	3/31/95
Review (EPA/State)	59ed	3/31/95	5/29/95
Draft Final	30ed	5/29/95	6/28/95
Review (EPA/State)	30ed	6/28/95	7/28/95
Final	28ed	7/28/95	8/25/95
RI FIELD INVESTIGATION	**58ed**	**9/4/95**	**11/1/95**
Mobilization	3ed	9/4/95	9/7/95
Field Investigation	55ed	9/7/95	11/1/95
SAMPLE ANALYSIS/VALIDATION	**108ed**	**9/8/95**	**12/25/95**
Sample Analysis	94ed	9/8/95	12/11/95
Data Validation	54ed	11/1/95	12/25/95

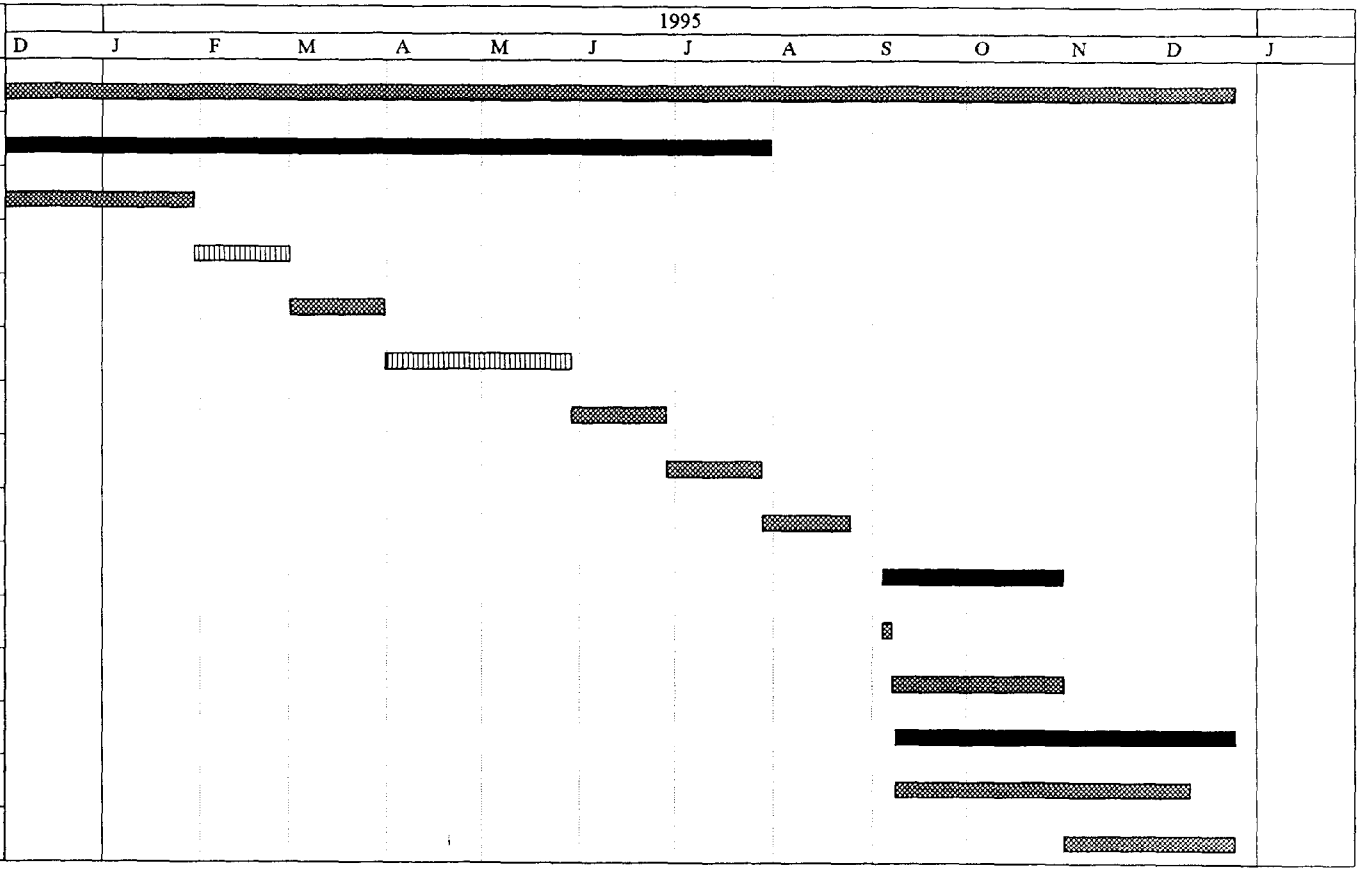


Figure D - 4

FY 95/96: Sites 4 and 21 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 4 and 21	717ed	12/22/94	12/8/96
REMEDIAL INVESTIGATION REPORT	**242ed**	**12/22/94**	**8/21/95**
Preliminary Draft	60ed	12/22/94	2/20/95
Review (Navy)	31ed	2/20/95	3/23/95
Draft	30ed	3/23/95	4/22/95
Review (EPA/State)	61ed	4/22/95	6/22/95
Draft Final	31ed	6/22/95	7/23/95
Review (EPA/State)	29ed	7/23/95	8/21/95
Final	32ed	8/21/95	9/22/95
FEASIBILITY STUDY	**274ed**	**1/23/95**	**10/24/95**
Preliminary Draft	63ed	1/23/95	3/27/95
Review (Navy)	29ed	3/27/95	4/25/95
Draft	31ed	4/25/95	5/26/95
Review (EPA/State)	61ed	5/26/95	7/26/95
Draft Final	30ed	7/26/95	8/25/95
Review (EPA/State)	30ed	8/25/95	9/24/95
Final	30ed	9/24/95	10/24/95
PROPOSED PLAN	**274ed**	**1/23/95**	**10/24/95**
Preliminary Draft	63ed	1/23/95	3/27/95
Review (Navy)	29ed	3/27/95	4/25/95
Draft	31ed	4/25/95	5/26/95
Review (EPA/State)	61ed	5/26/95	7/26/95

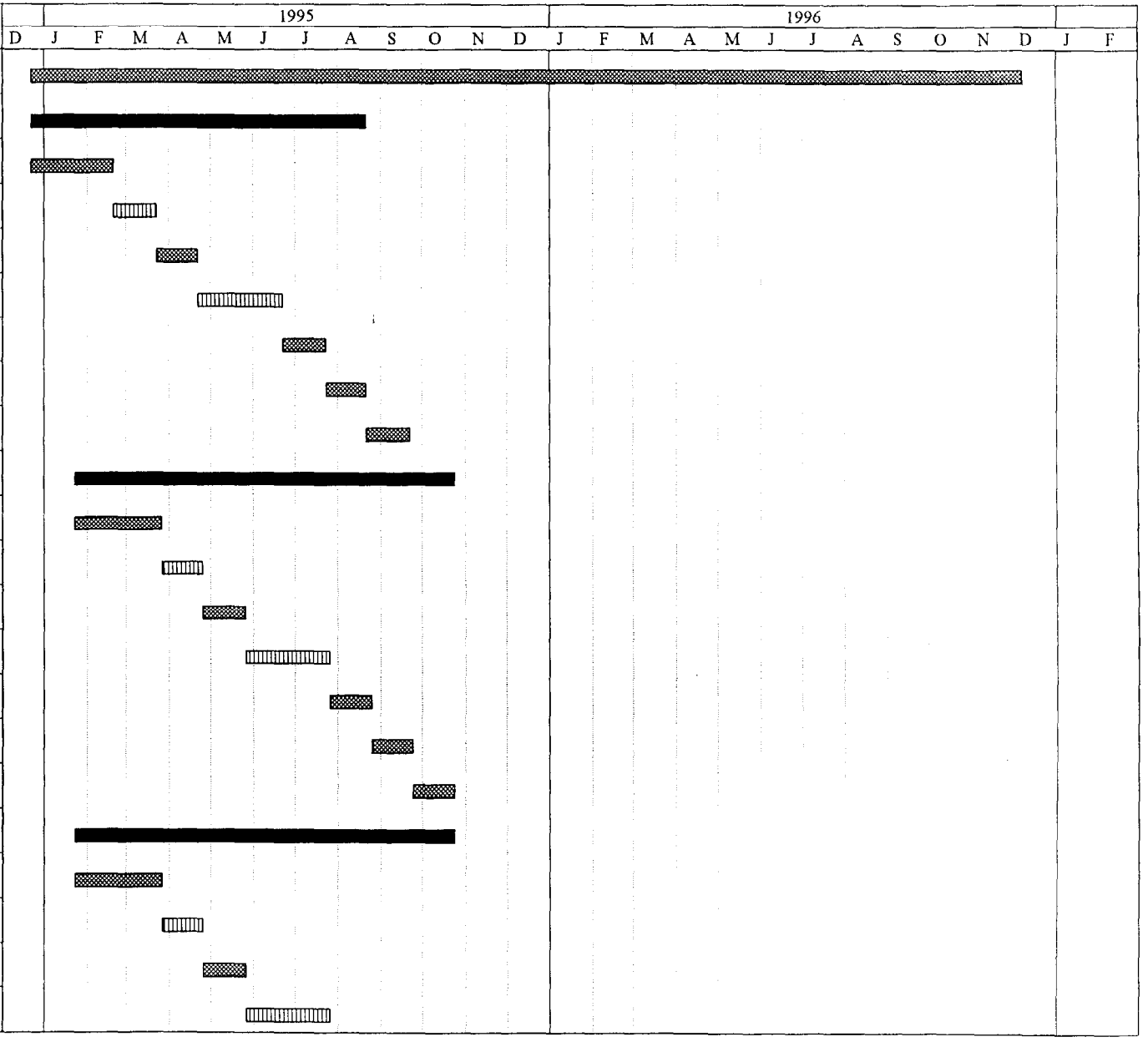


Figure D - 4

FY 95/96: Sites 4 and 21 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Draft Final	30ed	7/26/95	8/25/95
Review (EPA/State)	30ed	8/25/95	9/24/95
Final	30ed	9/24/95	10/24/95
PUBLIC COMMENT PERIOD	**46ed**	**9/21/95**	**11/6/95**
RECORD OF DECISION	**241ed**	**3/24/95**	**11/20/95**
Preliminary Draft	30ed	4/23/95	5/23/95
Review (Navy)	30ed	5/23/95	6/22/95
Draft	32ed	6/22/95	7/24/95
Review (EPA/State)	59ed	7/24/95	9/21/95
Draft Final	30ed	9/21/95	10/21/95
Review (EPA/State)	30ed	10/21/95	11/20/95
Final	30ed	11/20/95	12/20/95
REMEDIAL DESIGN	**353ed**	**12/20/95**	**12/7/96**
Draft Remedial Design/Work Plans	92ed	12/20/95	3/21/96
Review (Navy/EPA/State)	61ed	3/21/96	5/21/96
Prefial Remedial Design/Work Plans	61ed	5/21/96	7/21/96
Review (Navy/EPA/State)	45ed	7/21/96	9/4/96
Final Remedial Design/Work Plans	60ed	9/4/96	11/3/96
Review/Concurrance (EPA/State)	5ed	11/3/96	11/8/96
Construction Contracting	29ed	11/8/96	12/7/96
REMEDIAL ACTION	**1ed**	**12/7/96**	**12/8/96**

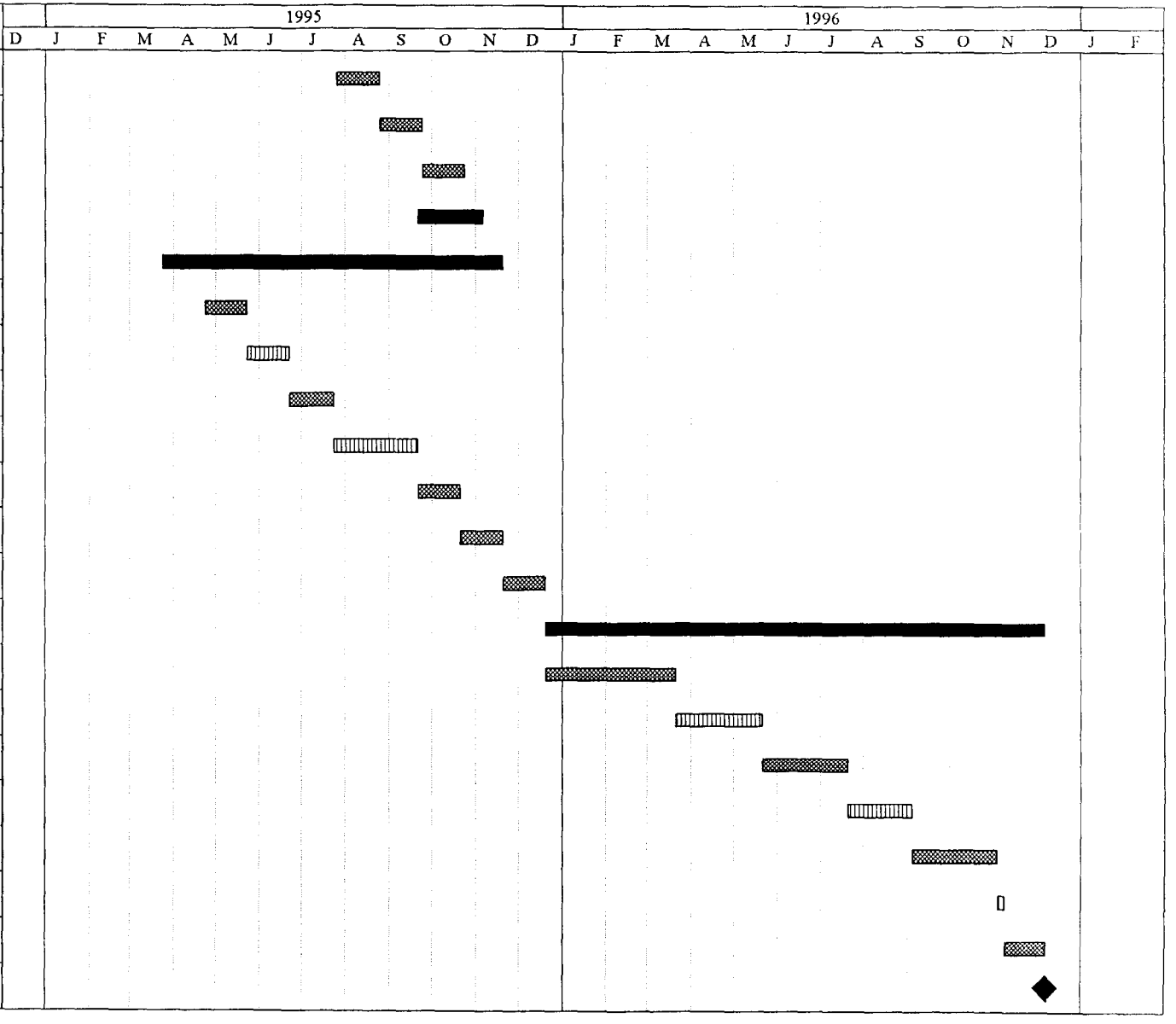


Figure D - 5

FY 95/96: Site 12 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision, and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Site 12	794ed	3/31/95	6/2/97
REMEDIAL INVESTIGATION REPORT	**273ed**	**3/31/95**	**12/29/95**
Preliminary Draft	61ed	3/31/95	5/31/95
Review (Navy)	30ed	5/31/95	6/30/95
Draft	31ed	6/30/95	7/31/95
Review (EPA/State)	60ed	7/31/95	9/29/95
Draft Final	31ed	9/29/95	10/30/95
Review (EPA/State)	30ed	10/30/95	11/29/95
Final	60ed	10/30/95	12/29/95
FEASIBILITY STUDY	**276ed**	**4/28/95**	**1/29/96**
Preliminary Draft	62ed	4/28/95	6/29/95
Review (Navy)	32ed	6/29/95	7/31/95
Draft	30ed	7/31/95	8/30/95
Review (EPA/State)	61ed	8/30/95	10/30/95
Draft Final	30ed	10/30/95	11/29/95
Review (EPA/State)	30ed	11/29/95	12/29/95
Final	31ed	12/29/95	1/29/96
PROPOSED PLAN	**276ed**	**4/28/95**	**1/29/96**
Preliminary Draft	62ed	4/28/95	6/29/95
Review (Navy)	32ed	6/29/95	7/31/95
Draft	30ed	7/31/95	8/30/95
Review (EPA/State)	61ed	8/30/95	10/30/95

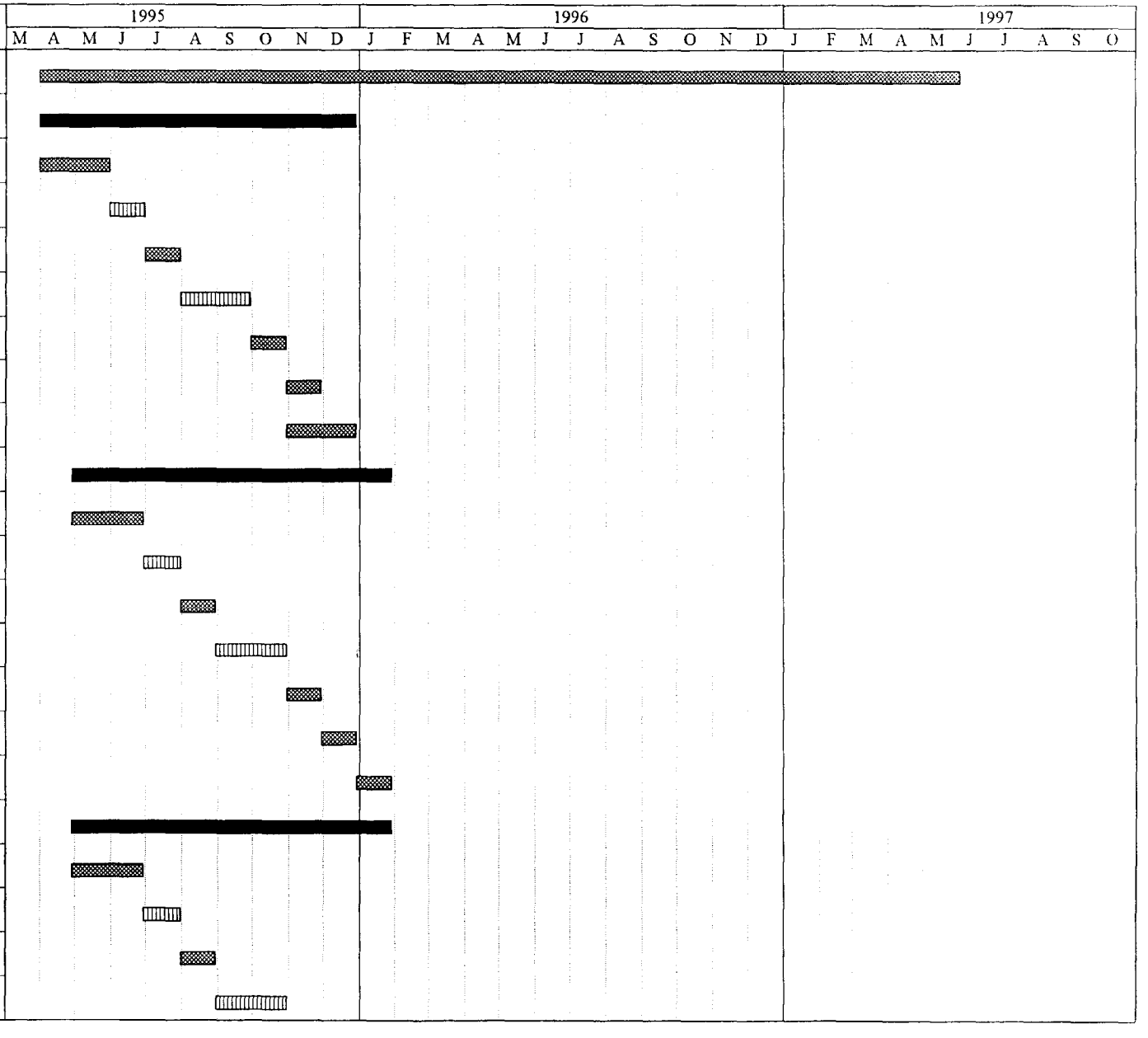


Figure D - 5

FY 95/96: Site 12 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision, and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Draft Final	30ed	10/30/95	11/29/95
Review (EPA/State)	30ed	11/29/95	12/29/95
Final	31ed	12/29/95	1/29/96
PUBLIC COMMENT PERIOD	**45ed**	**1/29/96**	**3/14/96**
RECORD OF DECISION	**213ed**	**6/30/95**	**1/29/96**
Preliminary Draft	61ed	6/30/95	8/30/95
Review (Navy)	30ed	8/30/95	9/29/95
Draft	31ed	9/29/95	10/30/95
Review (EPA/State)	60ed	10/30/95	12/29/95
Draft Final	31ed	12/29/95	1/29/96
Review (EPA/State)	30ed	1/29/96	2/28/96
Final	30ed	2/28/96	3/29/96
REMEDIAL DESIGN	**364ed**	**3/29/96**	**3/28/97**
Draft Remedial Design/Work Plans	108ed	3/29/96	7/15/96
Review (Navy/EPA/State)	60ed	7/15/96	9/13/96
Prefinal Remedial Design/Work Plans	60ed	9/13/96	11/12/96
Review (Navy/EPA/State)	62ed	11/12/96	1/13/97
Final Remedial Design/Work Plans	59ed	1/13/97	3/13/97
Review (Navy/EPA/State)	15ed	3/13/97	3/28/97
Construction Contracting	65ed	3/28/97	6/1/97
REMEDIAL ACTION	**1ed**	**6/1/97**	**6/2/97**

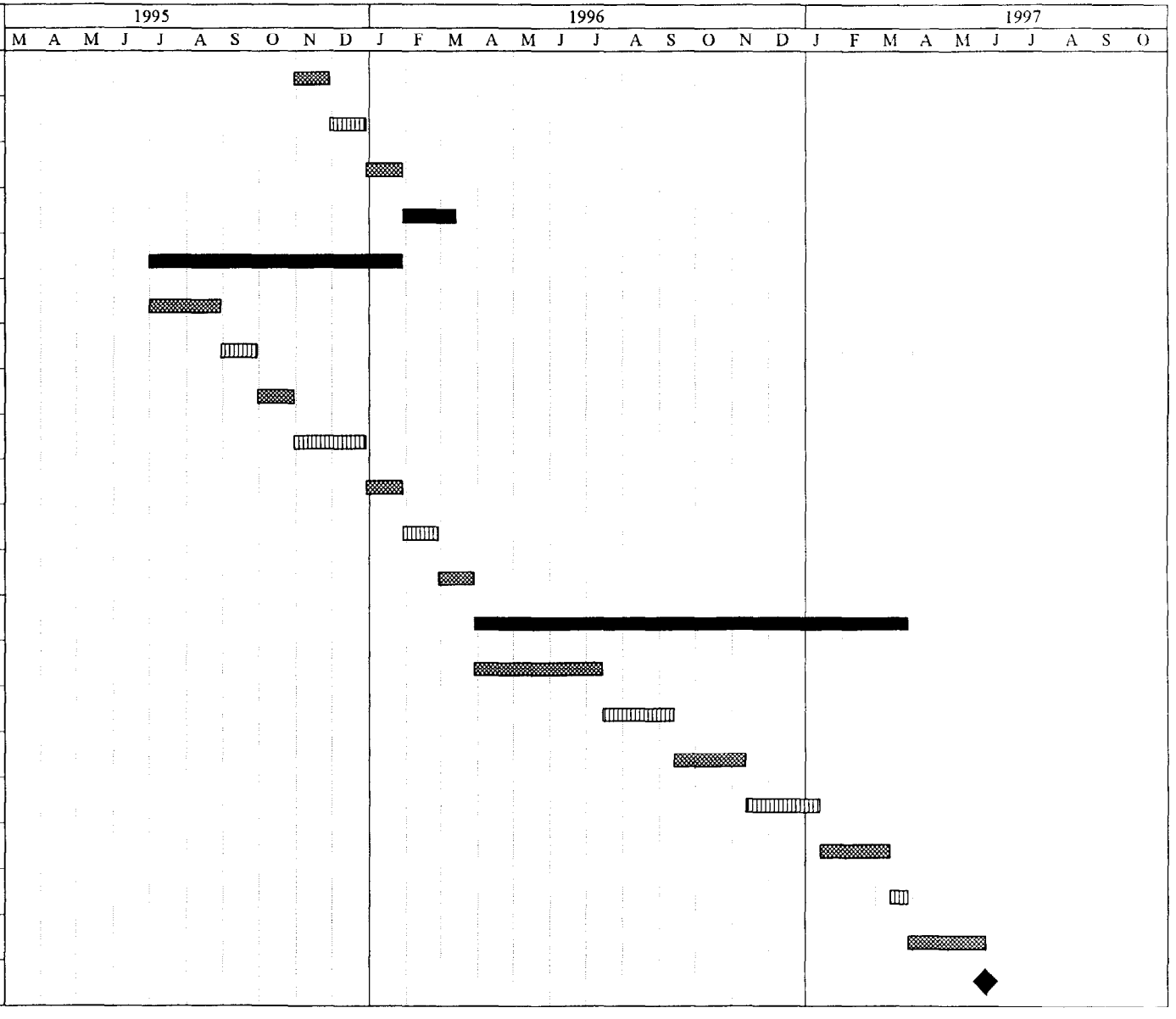


Figure D - 6

FY 95/96: Site Screening Areas 8, 11, 12 and 13
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 8, 11, 12 and 13	486ed	5/15/95	9/12/96
SSA WORK PLAN	**151ed**	**5/15/95**	**10/13/95**
Draft	31ed	5/15/95	6/15/95
Review (EPA/State)	52ed	6/15/95	8/6/95
Draft Final	30ed	8/6/95	9/5/95
Review (EPA/State)	32ed	9/14/95	10/16/95
Final	30ed	10/16/95	11/15/95
SSA FIELD INVESTIGATION	**67ed**	**10/13/95**	**12/19/95**
Mobilization	14ed	10/13/95	10/27/95
Field Investigation	53ed	10/27/95	12/19/95
SAMPLE ANALYSIS/VALIDATION	**102ed**	**10/20/95**	**1/30/96**
Sample Analysis	88ed	10/20/95	1/16/96
Data Validation	88ed	11/3/95	1/30/96
SSP REPORT	**226ed**	**1/30/96**	**9/12/96**
Preliminary Draft	46ed	1/30/96	3/16/96
Review (Navy)	30ed	3/16/96	4/15/96
Draft	30ed	4/15/96	5/15/96
Review (EPA/State)	60ed	5/15/96	7/14/96
Draft Final	30ed	7/14/96	8/13/96
Review (EPA/State)	30ed	8/13/96	9/12/96
Final	32ed	9/12/96	10/14/96

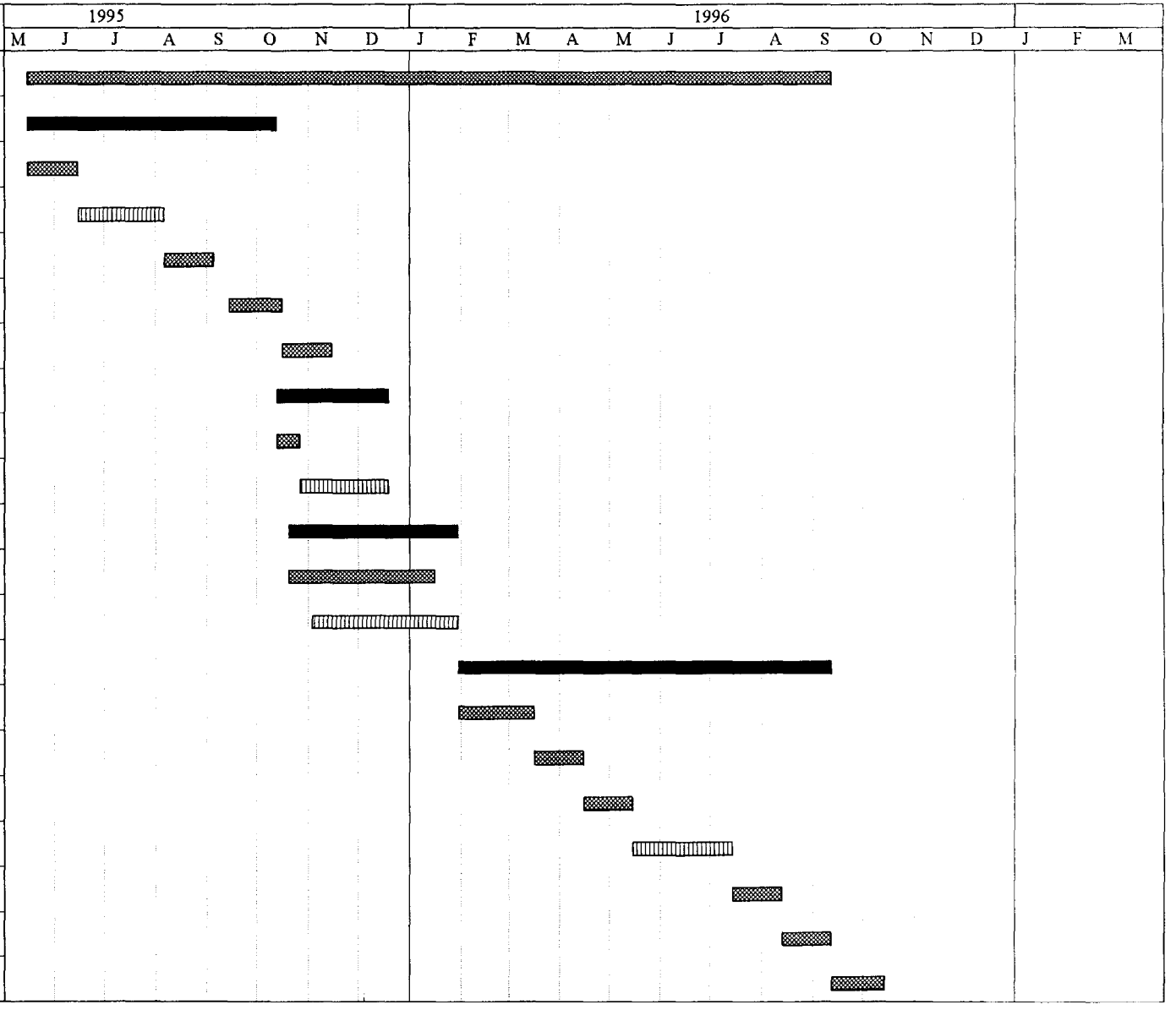


Figure D - 7

FY 95/96: Bench-Scale Treatability Study Proposed Schedule
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Description	Days	Start	Finish
PHASE I	**SOIL CHARACTERIZATION / SOIL COLLECTION**	**125ed**	**10/1/94**	**2/3/95**
Task 1	**Soil Characterization**	**93ed**	**10/1/94**	**1/2/95**
	Project Scope Development	61ed	10/1/94	12/1/94
	Soil Characterization Work Plan	61ed	10/1/94	12/1/94
	Navy Review	7ed	12/1/94	12/8/94
	Field Preparation/Mobilization	5ed	12/5/94	12/10/94
	Field Investigation	5ed	12/12/94	12/17/94
	Laboratory Analysis	20ed	12/13/94	1/2/95
Task 2	**Soil Characterization Evaluation**	**7ed**	**1/5/95**	**1/12/95**
	Meeting @LANTDIV	0ed	1/5/95	1/5/95
	Meeting Summary	6ed	1/6/95	1/12/95
Task 3	**Soil Sample Collection**	**21ed**	**1/13/95**	**2/3/95**
	Field Preparation	2ed	1/13/95	1/15/95
	Soil Collection	3ed	1/16/95	1/19/95
	Laboratory Analysis	7ed	1/19/95	1/26/95
	W.E.S Collection	1d	1/30/95	1/30/95
	Documentation/Reporting	18ed	1/16/95	2/3/95

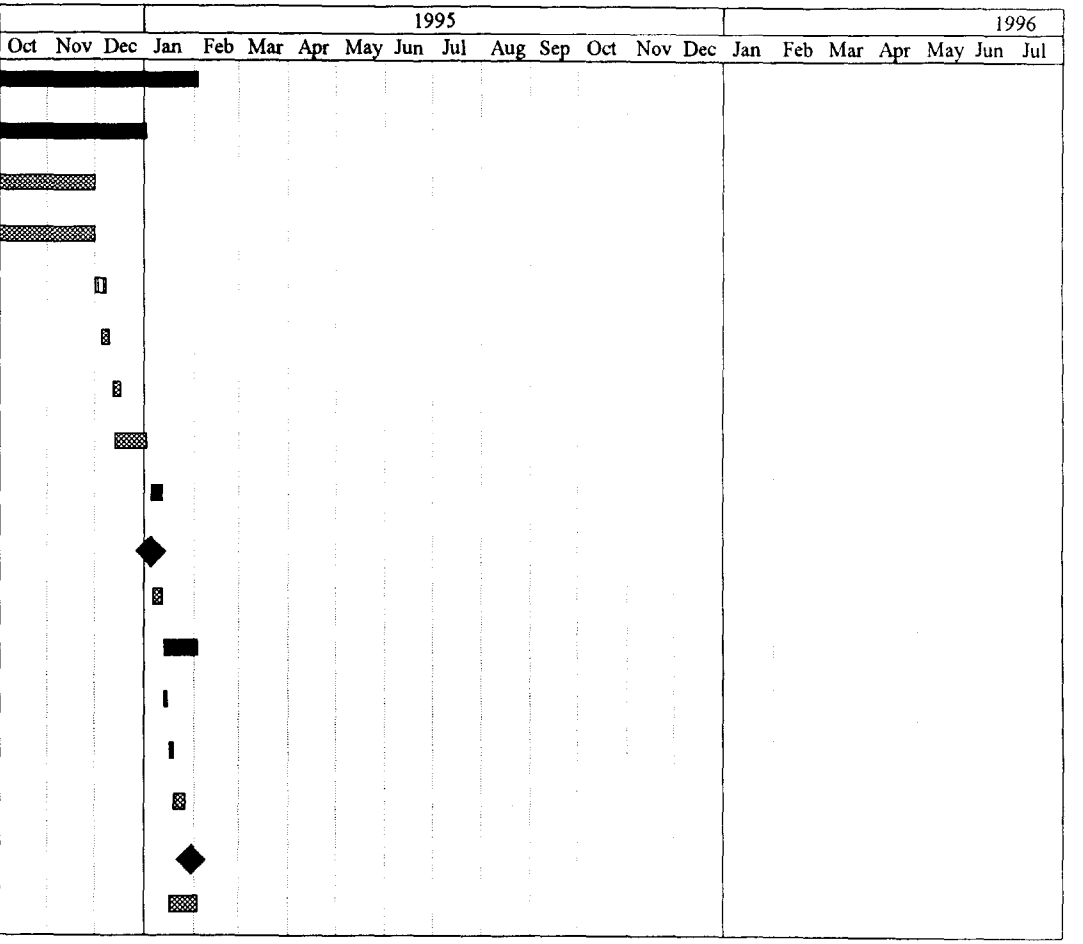
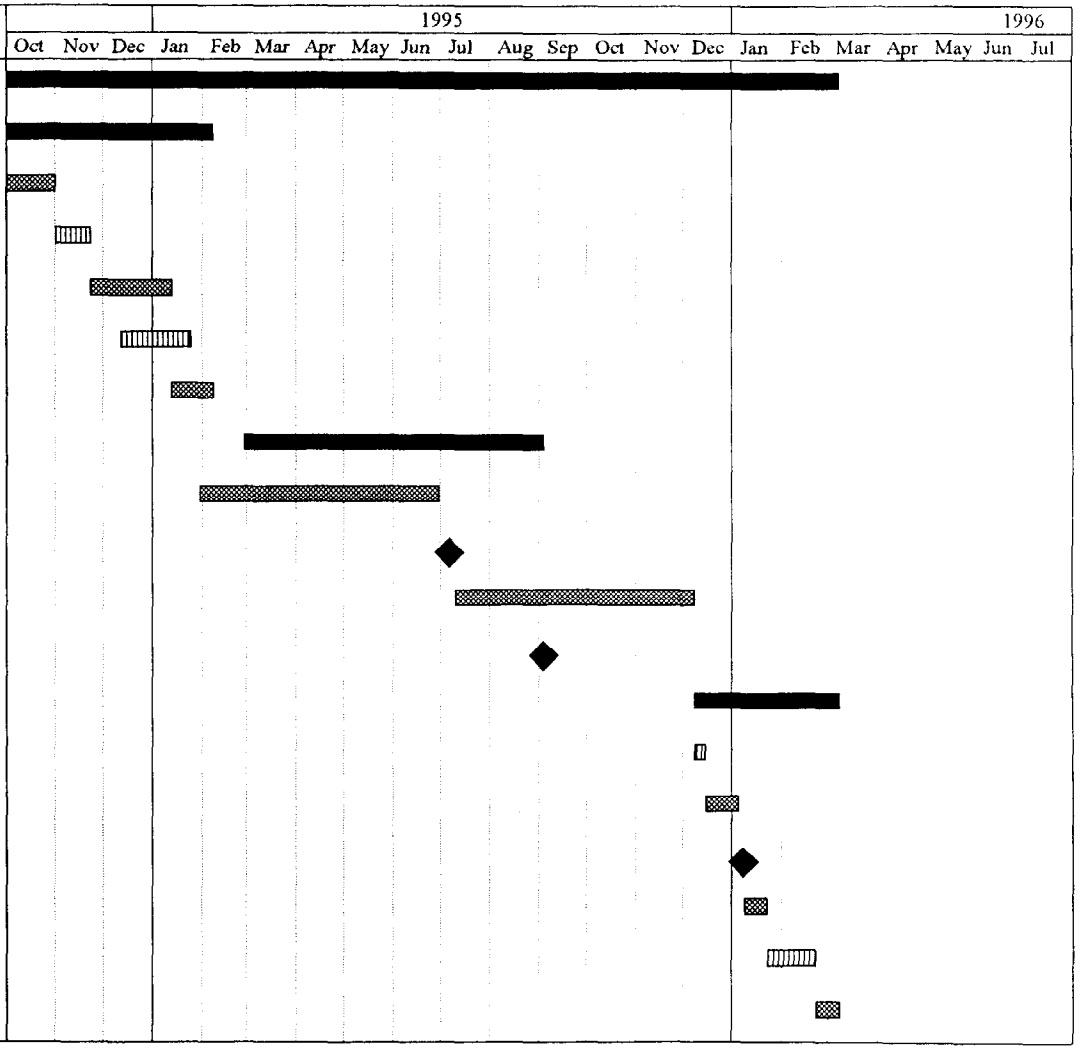


Figure D - 7

FY 95/96: Bench-Scale Treatability Study Proposed Schedule
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Description	Days	Start	Finish
PHASE II	**BENCH-SCALE TREATABILITY STUDIES**	**524ed**	**10/1/94**	**3/8/96**
Task 4	**Treatability Study Work Plan**	**130ed**	**10/1/94**	**2/8/95**
	Preliminary Draft Work Plan (WES)	31ed	10/1/94	11/1/94
	Navy/Baker Review	22ed	11/1/94	11/23/94
	Draft Work Plan (WES)	51ed	11/23/94	1/13/95
	EPA/State Review	44ed	12/12/94	1/25/95
	Final Work Plan (WES/Baker)	27ed	1/12/95	2/8/95
Task 5	**Bench-Scale Treatability Study**	**189ed**	**2/27/95**	**9/4/95**
	Phase I to III	151ed	1/30/95	6/30/95
	Meeting @ WES	0ed	7/7/95	7/7/95
	Phase IV to VII	151ed	7/10/95	12/8/95
	Meeting @ WES	0ed	9/4/95	9/4/95
Task 6	**Treatability Study Report (T.S.)**	**91ed**	**12/8/95**	**3/8/96**
	Review WES TS	7ed	12/8/95	12/15/95
	Preliminary Draft T.S. (Baker)	21ed	12/15/95	1/5/96
	Meeting @ LANTDIV	0ed	1/8/96	1/8/96
	Draft T.S. (WES/Baker)	14ed	1/9/96	1/23/96
	EPA/State Review	30ed	1/23/96	2/22/96
	Final T.S. Report (Baker)	15ed	2/22/96	3/8/96



APPENDIX E
DETAILED SCHEDULES: FY 1996 AND 1997
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure E - 1

FY 96/97: Sites 1 and 3 Work Plan/Field Investigation
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 1 and 3	347ed	12/1/95	11/12/96
RI WORK PLAN	**241ed**	**12/1/95**	**7/29/96**
Preliminary Draft	62ed	12/1/95	2/1/96
Review (Navy)	29ed	2/1/96	3/1/96
Draft	31ed	3/1/96	4/1/96
Review (EPA/State)	60ed	4/1/96	5/31/96
Draft Final	31ed	5/31/96	7/1/96
Review (EPA/State)	31ed	7/1/96	8/1/96
Final	32ed	8/1/96	9/2/96
RI FIELD INVESTIGATION	**61ed**	**8/1/96**	**10/1/96**
Mobilization	7ed	8/1/96	8/8/96
Field Investigation	54ed	8/8/96	10/1/96
SAMPLE ANALYSIS/VALIDATION	**96ed**	**8/8/96**	**11/12/96**
Sample Analysis	82ed	8/8/96	10/29/96
Data Validation	82ed	8/22/96	11/12/96

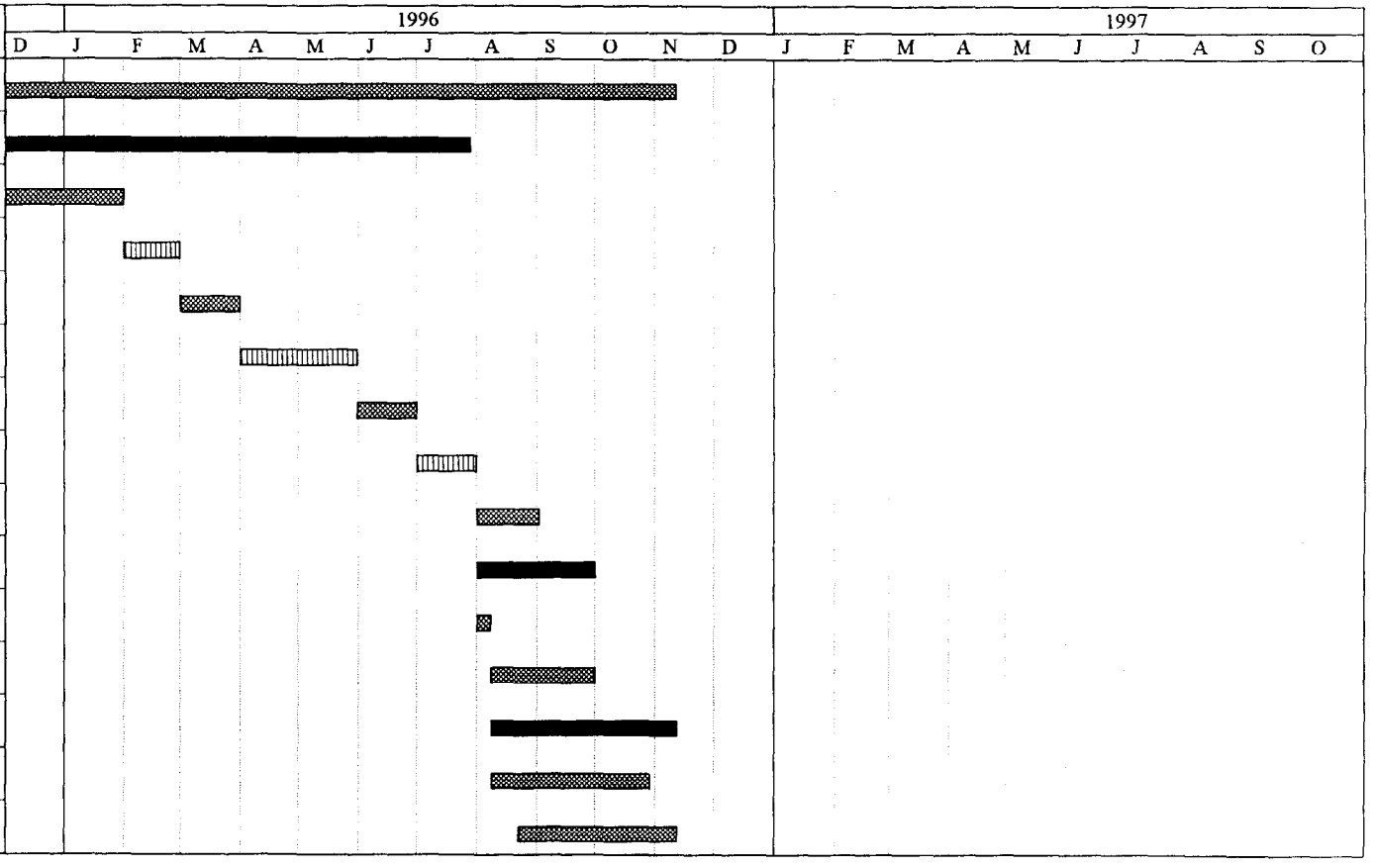


Figure E - 2

FY 96/97: Sites 6 and 7 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 6 and 7	762ed	5/1/96	6/2/98
REMEDIAL INVESTIGATION REPORT	**278ed**	**5/1/96**	**2/3/97**
Preliminary Draft	61ed	5/1/96	7/1/96
Review (Navy)	31ed	7/1/96	8/1/96
Draft	31ed	8/1/96	9/1/96
Review (EPA/State)	61ed	9/1/96	11/1/96
Draft Final	31ed	11/1/96	12/2/96
Review (EPA/State)	31ed	12/2/96	1/2/97
Final	32ed	1/2/97	2/3/97
FEASIBILITY STUDY	**277ed**	**6/1/96**	**3/5/97**
Preliminary Draft	61ed	6/1/96	8/1/96
Review (Navy)	32ed	8/1/96	9/2/96
Draft	30ed	9/2/96	10/2/96
Review (EPA/State)	61ed	10/2/96	12/2/96
Draft Final	31ed	12/2/96	1/2/97
Review (EPA/State)	32ed	1/2/97	2/3/97
Final	30ed	2/3/97	3/5/97
PROPOSED PLAN	**277ed**	**6/1/96**	**3/5/97**
Preliminary Draft	62ed	6/1/96	8/2/96
Review (Navy)	31ed	8/2/96	9/2/96
Draft	30ed	9/2/96	10/2/96
Review (EPA/State)	61ed	10/2/96	12/2/96

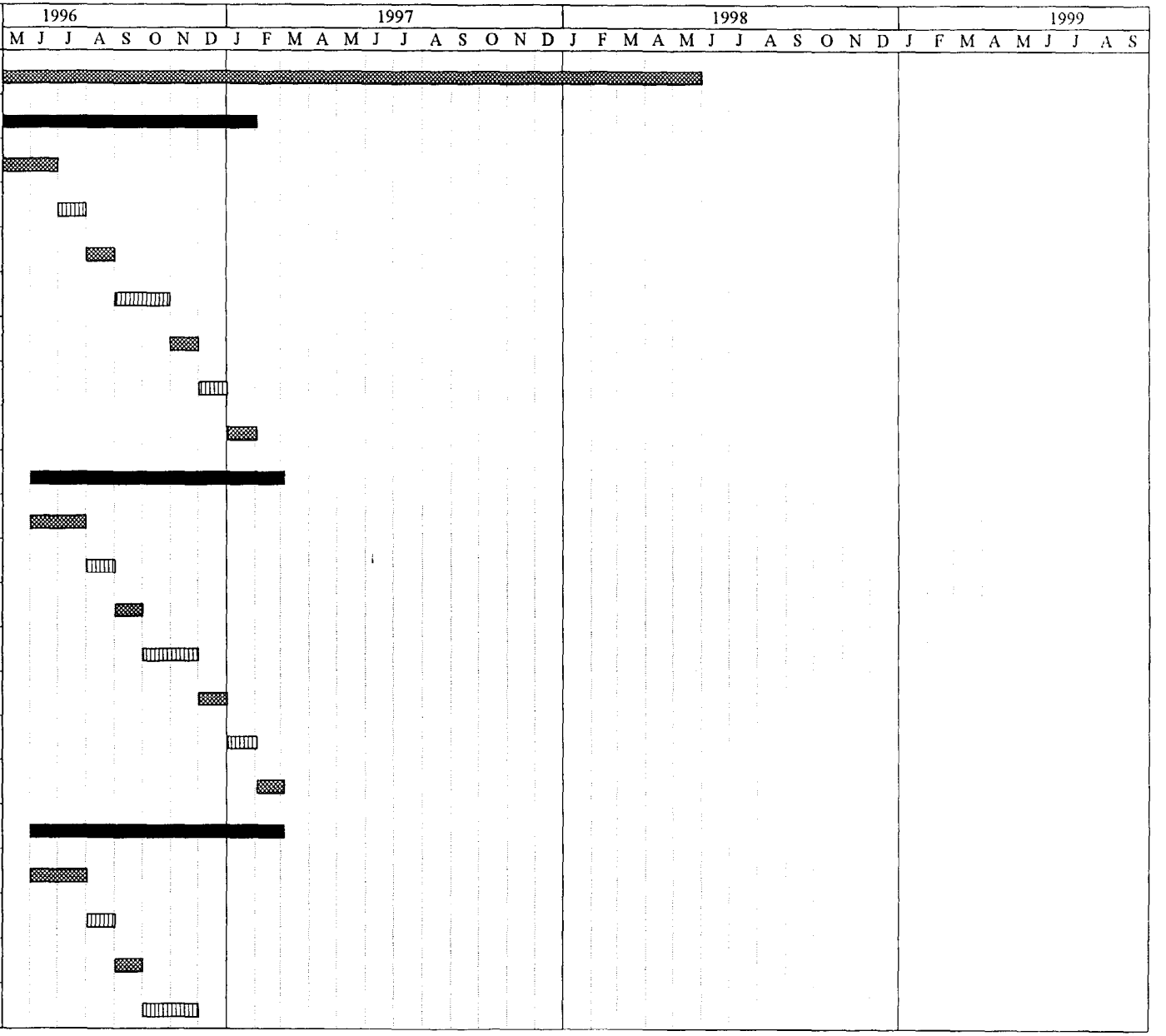


Figure E - 2

FY 96/97: Sites 6 and 7 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Draft Final	31ed	12/2/96	1/2/97
Review (EPA/State)	32ed	1/2/97	2/3/97
Final	30ed	2/3/97	3/5/97
PUBLIC COMMENT PERIOD	**47ed**	**3/5/97**	**4/21/97**
RECORD OF DECISION	**239ed**	**9/2/96**	**4/29/97**
Preliminary Draft	29ed	9/2/96	10/1/96
Review (Navy)	30ed	10/1/96	10/31/96
Draft	29ed	10/31/96	11/29/96
Review (EPA/State)	60ed	11/29/96	1/28/97
Draft Final	30ed	1/28/97	2/27/97
Review (EPA/State)	29ed	2/27/97	3/28/97
Final	32ed	3/28/97	4/29/97
REMEDIAL DESIGN	**394ed**	**4/29/97**	**5/28/98**
Draft Remedial Design/Work Plans	153ed	4/29/97	9/29/97
Review (Navy/EPA/State)	60ed	9/29/97	11/28/97
Prefial Remedial Design/Work Plans	60ed	11/28/97	1/27/98
Review (Navy/EPA/State)	45ed	1/27/98	3/13/98
Final Remedial Design/Work Plans	61ed	3/13/98	5/13/98
Review/Concurrance (EPA/State)	15ed	5/13/98	5/28/98
Construction Contracting	60ed	5/28/98	7/27/98
REMEDIAL ACTION	**1ed**	**7/27/98**	**7/28/98**

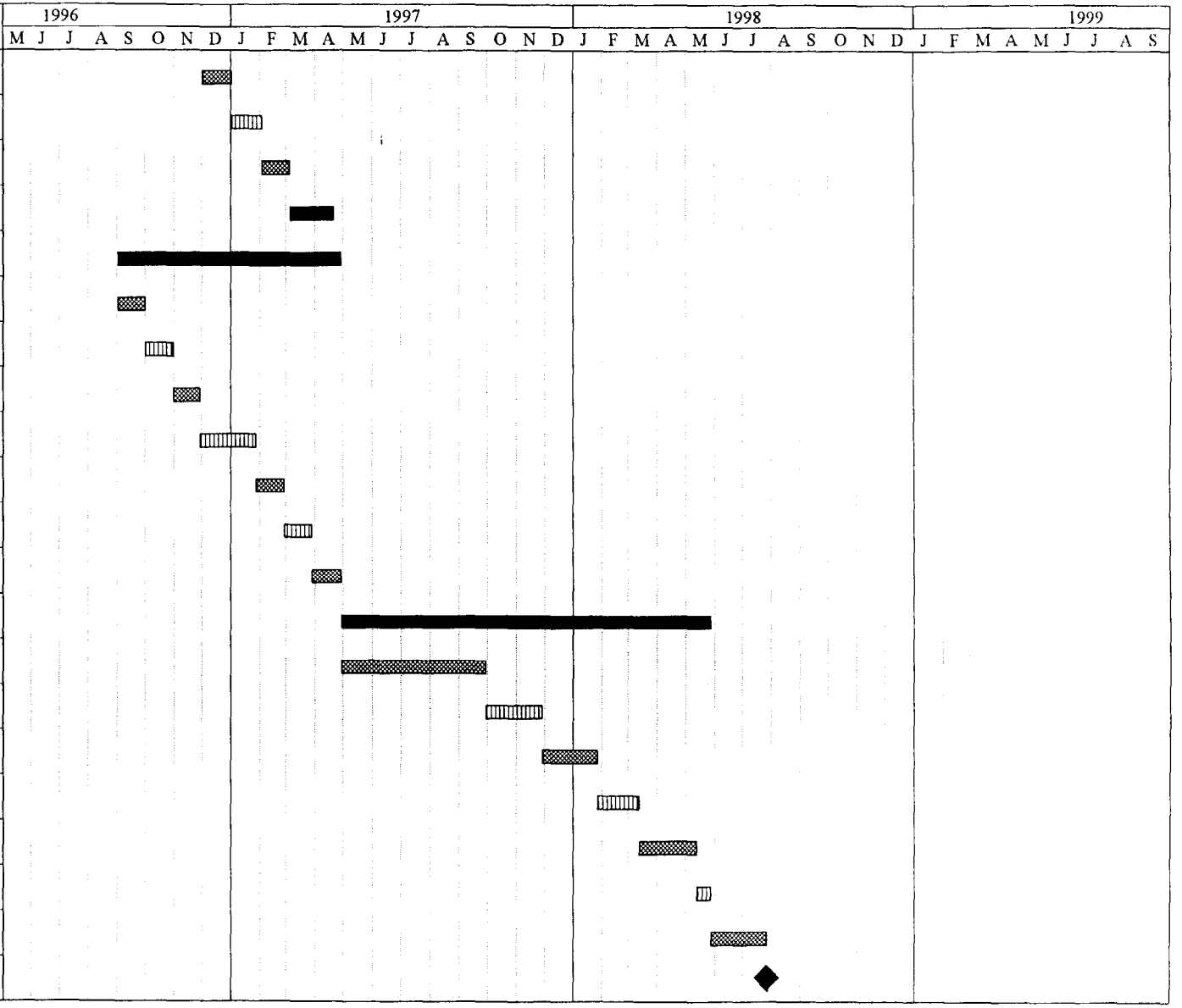


Figure E - 3

FY 96/97: Site Screening Areas 4, 5 and 10 Work Plan, Field Investigation and Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SITE SCREENING AREAS 4, 5 and 10	454ed	9/15/96	12/13/97
SSA WORK PLAN	**183ed**	**9/15/96**	**3/17/97**
Draft	30ed	9/15/96	10/15/96
Review (EPA/State)	62ed	10/15/96	12/16/96
Draft Final	30ed	12/16/96	1/15/97
Review (EPA/State)	30ed	1/15/97	2/14/97
Final	31ed	2/14/97	3/17/97
SSA FIELD INVESTIGATION	**49ed**	**3/17/97**	**5/5/97**
Mobilization	4ed	3/17/97	3/21/97
Field Investigation	45ed	3/21/97	5/5/97
SAMPLE ANALYSIS/VALIDATION	**89ed**	**3/22/97**	**6/19/97**
Sample Analysis	75ed	3/22/97	6/5/97
Data Validation	59ed	4/21/97	6/19/97
SSP REPORT	**272ed**	**5/1/97**	**1/28/98**
Preliminary Draft	60ed	5/1/97	6/30/97
Review (Navy)	30ed	6/30/97	7/30/97
Draft	30ed	7/30/97	8/29/97
Review (EPA/State)	61ed	8/29/97	10/29/97
Draft Final	30ed	10/29/97	11/28/97
Review (EPA/State)	31ed	11/28/97	12/29/97
Final	30ed	12/29/97	1/28/98

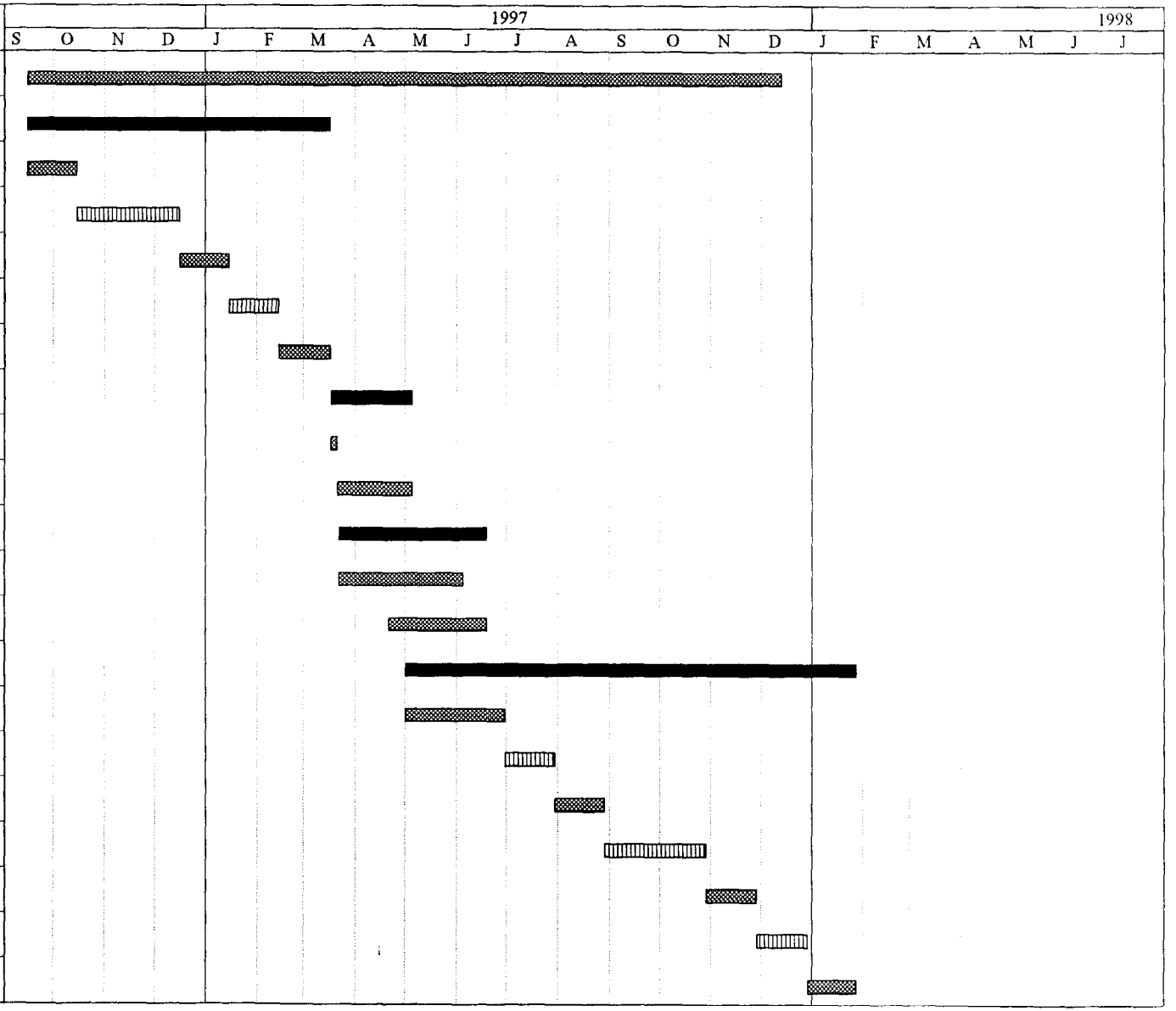


Figure E - 4

FY 96/97: Sites 11 and 17 Work Plan, Field Investigation
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
RI WORK PLAN	**272ed**	**7/1/96**	**3/30/97**
Preliminary Draft	62ed	7/1/96	9/1/96
Review (Navy)	30ed	9/1/96	10/1/96
Draft	30ed	10/1/96	10/31/96
Review (EPA/State)	60ed	10/31/96	12/30/96
Draft Final	31ed	12/30/96	1/30/97
Review (EPA/State)	30ed	1/30/97	3/1/97
Final	29ed	3/1/97	3/30/97
RI FIELD INVESTIGATION	**32ed**	**3/30/97**	**5/1/97**
Mobilization	7ed	3/1/97	3/8/97
Field Investigation	54ed	3/8/97	5/1/97
SAMPLE ANALYSIS/VALIDATION	**96ed**	**3/8/97**	**6/12/97**
Sample Analysis	82ed	3/8/97	5/29/97
Data Validation	82ed	3/22/97	6/12/97

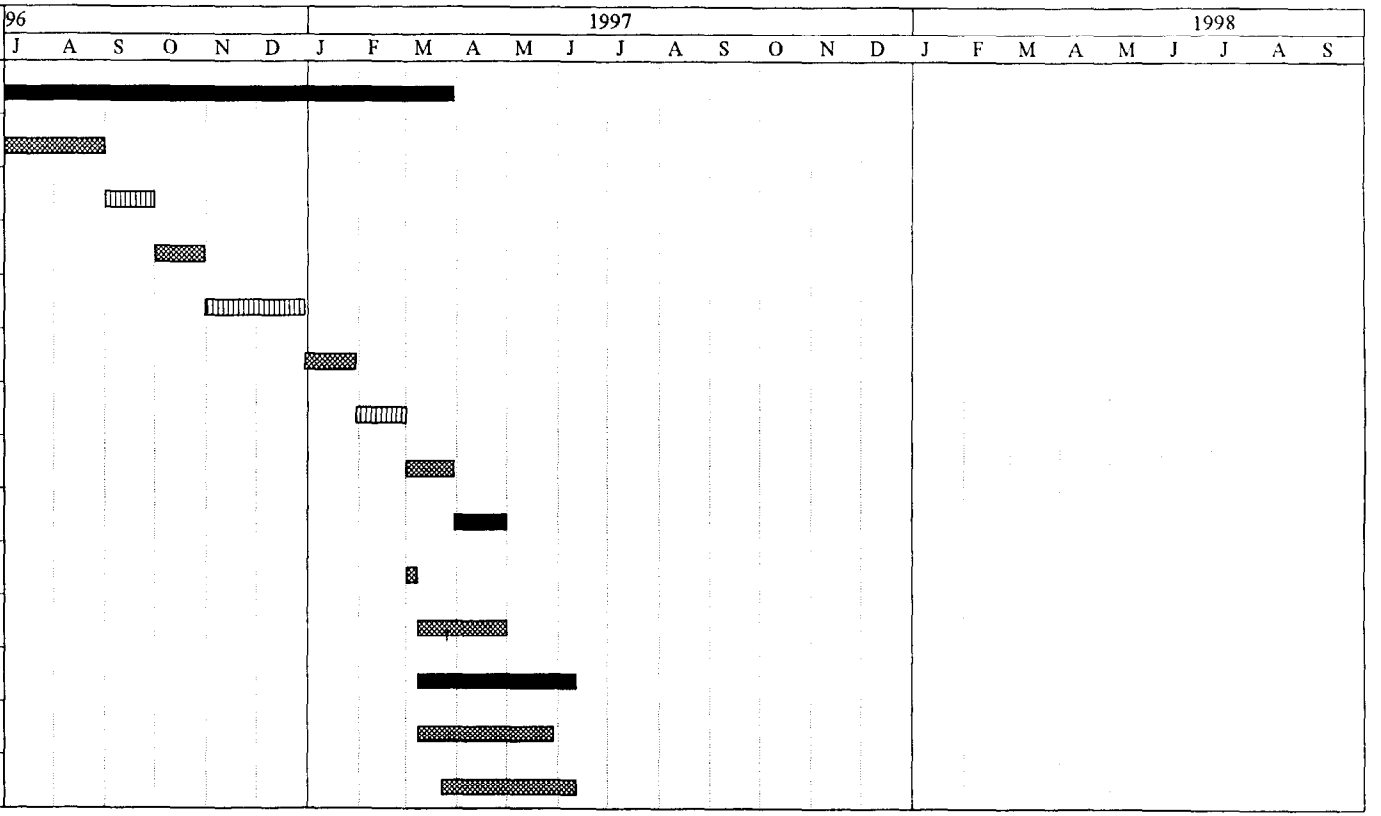


Figure E - 5

FY 96/97: Sites 1 and 3 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision, and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
REMEDIAL INVESTIGATION REPORT	**239ed**	**11/1/96**	**6/28/97**
Preliminary Draft	59ed	11/1/96	12/30/96
Review (Navy)	30ed	12/30/96	1/29/97
Draft	29ed	1/29/97	2/27/97
Review (EPA/State)	61ed	2/27/97	4/29/97
Draft Final	30ed	4/29/97	5/29/97
Final	30ed	5/29/97	6/28/97
FEASIBILITY STUDY	**240ed**	**11/30/96**	**7/28/97**
Preliminary Draft	60ed	11/30/96	1/29/97
Review (Navy)	30ed	1/29/97	2/28/97
Draft	30ed	2/28/97	3/30/97
Review (EPA/State)	60ed	3/30/97	5/29/97
Draft Final	30ed	5/29/97	6/28/97
Final	30ed	6/28/97	7/28/97
PROPOSED PLAN	**240ed**	**11/30/96**	**7/28/97**
Preliminary Draft	60ed	11/30/96	1/29/97
Review (Navy)	30ed	1/29/97	2/28/97
Draft	30ed	2/28/97	3/30/97
Review (EPA/State)	60ed	3/30/97	5/29/97
Draft Final	30ed	5/29/97	6/28/97
Final	30ed	6/28/97	7/28/97
PUBLIC COMMENT PERIOD	**45ed**	**7/28/97**	**9/11/97**

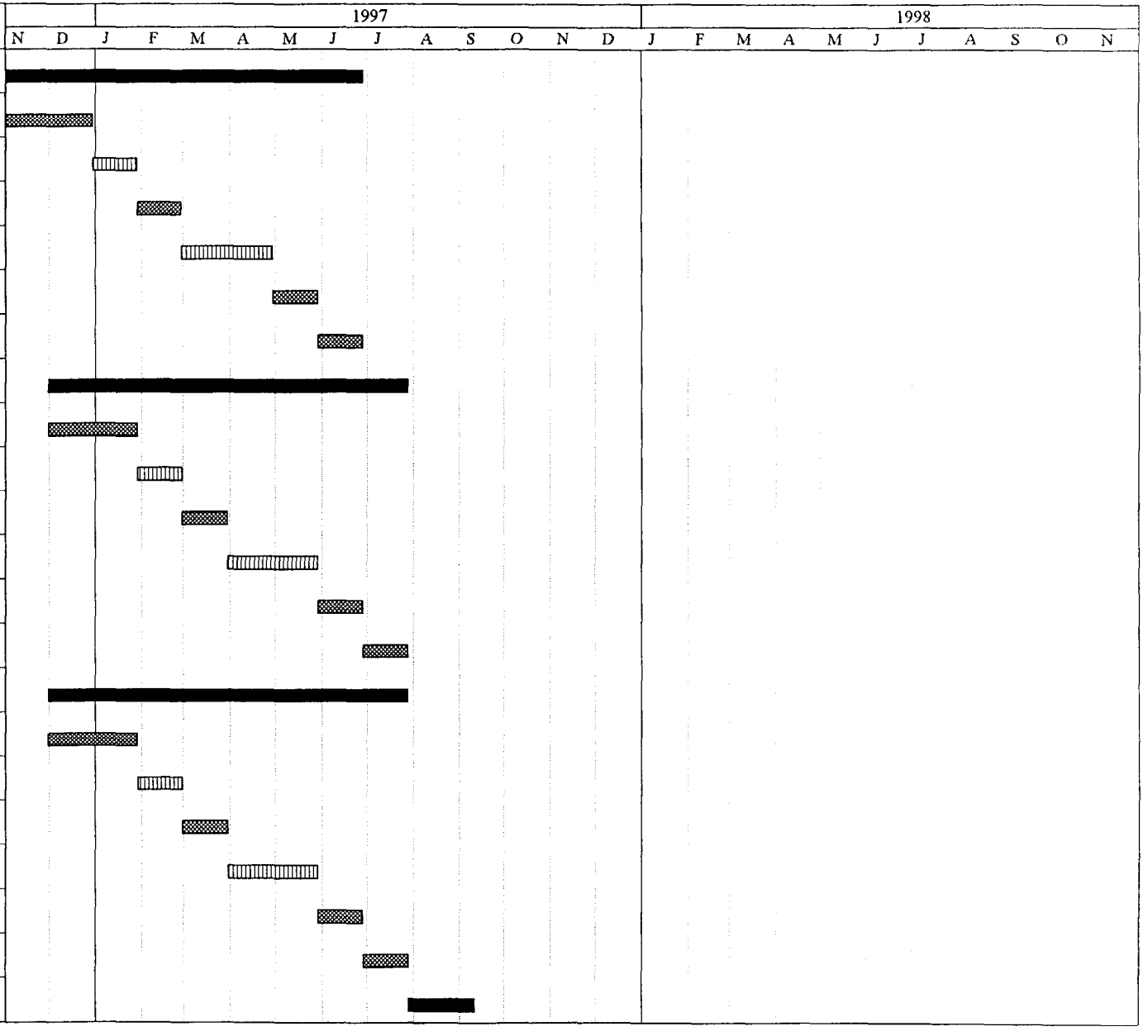
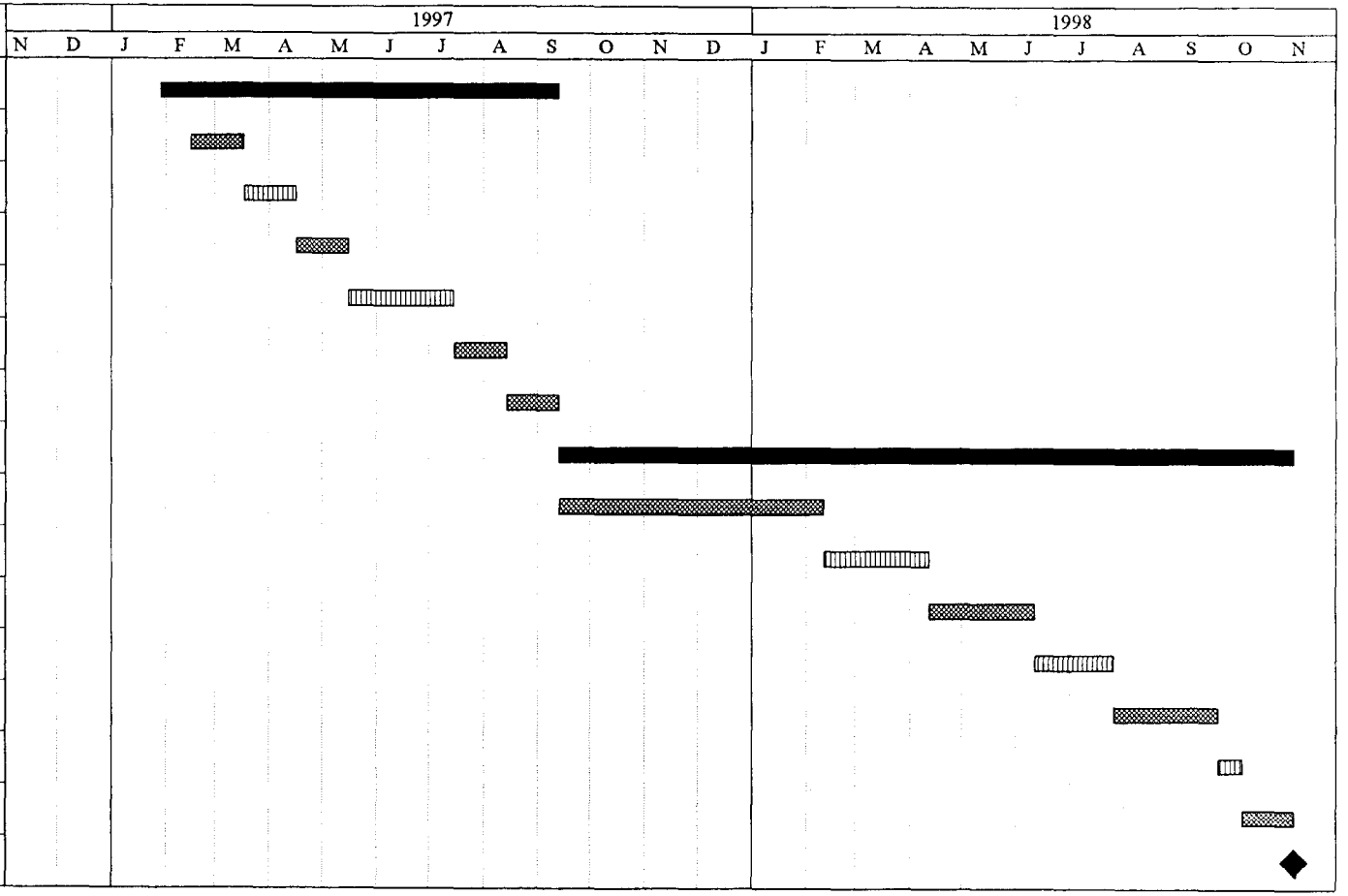


Figure 2 - 5

FY 96/97: Sites 1 and 3 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision, and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
RECORD OF DECISION	**227ed**	**1/29/97**	**9/13/97**
Preliminary Draft	30ed	2/15/97	3/17/97
Review (Navy)	30ed	3/17/97	4/16/97
Draft	30ed	4/16/97	5/16/97
Review (EPA/State)	60ed	5/16/97	7/15/97
Draft Final	30ed	7/15/97	8/14/97
Final	30ed	8/14/97	9/13/97
REMEDIAL DESIGN	**420ed**	**9/13/97**	**11/7/98**
Draft Remedial Design/Work Plans	151ed	9/13/97	2/11/98
Review (Navy/EPA/State)	60ed	2/11/98	4/12/98
Prefinal Remedial Design/Work Plans	60ed	4/12/98	6/11/98
Review (Navy/EPA/State)	45ed	6/11/98	7/26/98
Final Remedial Design/Work Plans	60ed	7/26/98	9/24/98
Review (Navy/EPA/State)	14ed	9/24/98	10/8/98
Construction Contracting	30ed	10/8/98	11/7/98
REMEDIAL ACTION	**1ed**	**11/7/98**	**11/8/98**



APPENDIX F
SUMMARY SCHEDULES: FY 1997 AND BEYOND
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure F - 1

FY 97 and beyond: SSAs 3, 9 and 14 Work Plan/Field Investigation and Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
SSAs 3, 9 and 14	276ed	5/1/97	2/1/98
Work Plan	151ed	5/1/97	9/29/97
Field Investigation	47ed	9/29/97	11/15/97
Sample Analysis/Validation	82ed	5/1/97	7/22/97
SSP Report	240ed	12/15/97	8/12/98

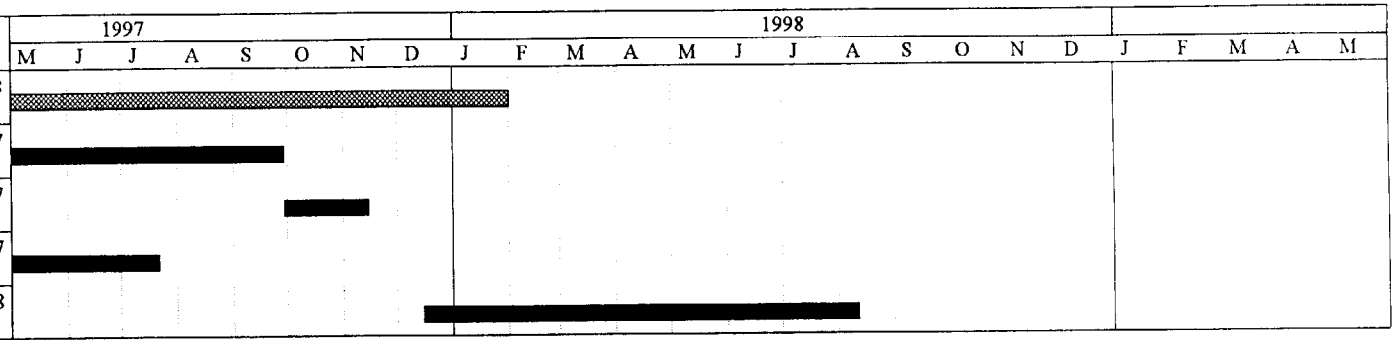


Figure r - 2

FY 97 and beyond: Site 8 and 23 RI/FS Work Plans
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
RI Work Plan	240ed	5/1/97	12/27/97
RI Field Investigation	58ed	1/2/98	3/1/98
Sample Analysis/Validation	93ed	1/9/98	4/12/98

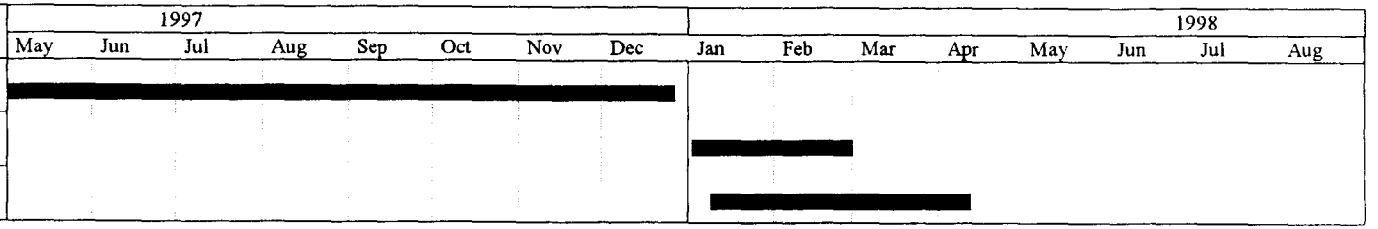


Figure F - 3

FY 97 and beyond: Sites 11 and 17 Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision, and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Remedial Investigation Report	245ed	6/1/97	2/1/98
Feasibility Study	243ed	7/1/97	3/1/98
Proposed Plan	244ed	7/1/97	3/2/98
Public Comment Period	45ed	2/1/98	3/18/98
Record of Decision	210ed	9/1/97	3/30/98
Remedial Design	153ed	4/1/98	9/1/98
Remedial Action	1ed	9/1/98	9/2/98

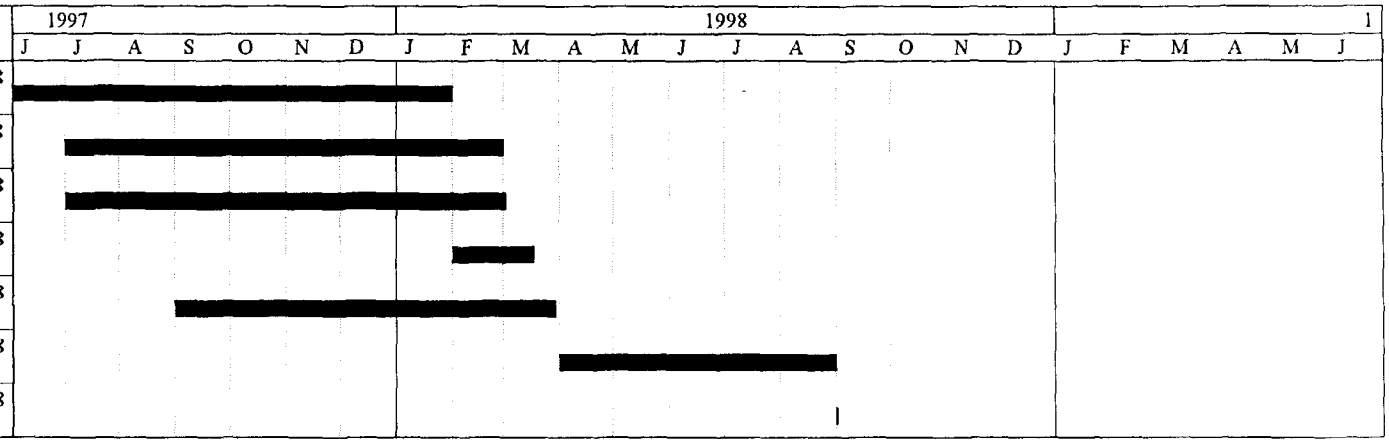


Figure F - 4

FY 97 and beyond: Site 8 and 23, Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Remedial Investigation Report	209ed	4/1/98	10/27/98
Feasibility Study	241ed	5/1/98	12/28/98
Proposed Plan	241ed	5/1/98	12/28/98
Record of Decision	210ed	7/1/98	1/27/99
Remedial Design	150ed	2/1/99	7/1/99
Remedial Action	1ed	7/1/99	7/2/99

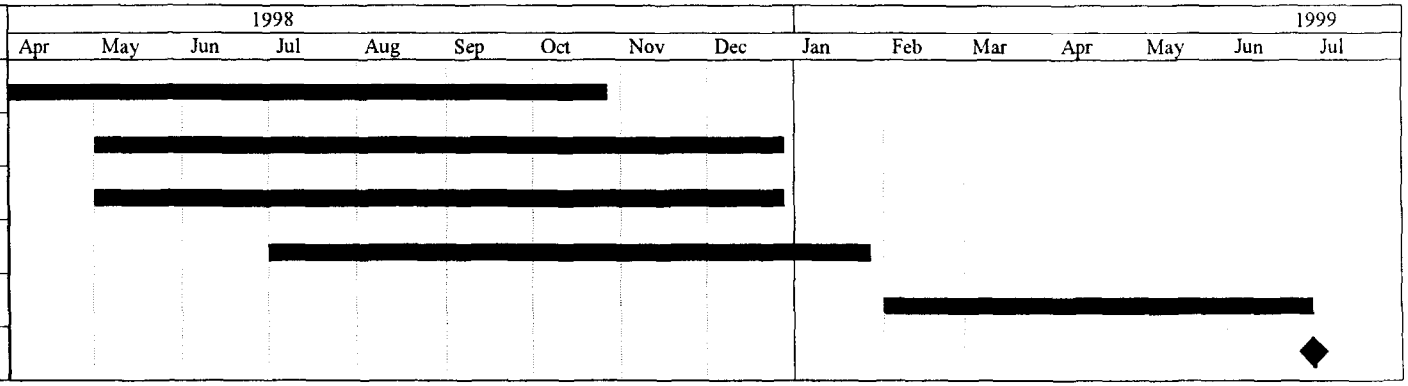


Figure F - 5

FY 97 and beyond: Site 2 and 18, Remedial Investigation, Feasibility Study, Proposed Plan, Record of Decision and Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish
Sites 2 and 18	50ed	2/1/98	3/23/98
Work Plan	242ed	2/1/98	10/1/98
Field Investigation	61ed	2/1/98	4/3/98
Sample Analysis/Validation	75ed	10/1/98	12/15/98
Remedial Investigation Report	242ed	1/2/99	9/1/99
Feasibility Study	242ed	2/1/99	10/1/99
Proposed Plan	242ed	2/1/99	10/1/99
Record of Decision	214ed	4/1/99	11/1/99
Remedial Design	458ed	11/1/99	2/1/01
Remedial Action	1ed	2/1/01	2/2/01